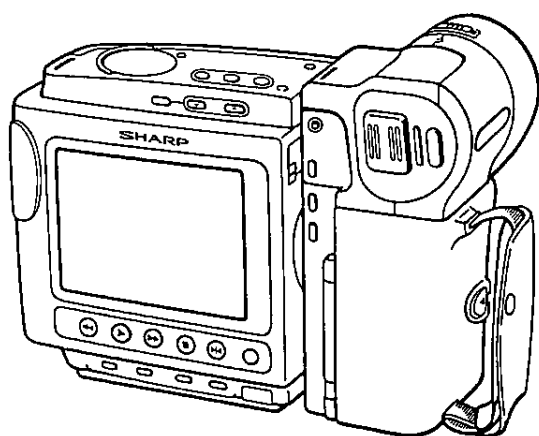


SHARP SERVICE MANUAL

S83E8VL-H400S



LIQUID CRYSTAL CAMCORDER **Hi8** PAL

VL-H400S/H/X MODELS VL-H9E

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified be used.

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SHARP CORPORATION

1. FEATURES

- Hi8 RECORDING/PLAYBACK SYSTEM
- FREE-ANGLE SHOOTING AND INSTANT REPLAY WITH 4" COLOUR MONITOR
- DIGITAL ELECTRONIC IMAGE STABILIZATION
- DIGITAL STILL/STROBE/ SNAP RECORDING
- Hi-Fi STEREO
- NEURO AUTO EXPOSURE
- DIGITAL AUTO WHITE BALANCE
- DIGITAL FULL RANGE AUTO FOCUS
- INFRARED REMOTE CONTROL
- 8× POWER ZOOM
- 16:9 WIDE SCREEN
- 1/10000, 1/4000, 1/1000, 1/250, 1/120, AND STANDARD 1/50, SECOND SWITCHABLE HIGH-SPEED ELECTRONIC SHUTTER FOR BLUR-FREE STILL IMAGES
- FADE IN/OUT
- FLYING ERASE HEAD FOR EDITING
- EDIT SEARCH
- WARNING INDICATORS – LOW BATTERY, LOW LIGHT, TAPE END, ETC.
- 3-WAY POWER SOURCE: AC, RECHARGEABLE BATTERY AND CAR BATTERY (with optional VR-P100CH)
- S-VIDEO SOCKET

2. SPECIFICATIONS

Signal System	PAL type colour signals.
Recording System	4 rotary heads, helical scanning FM system
Cassette	8 mm video tape, MP type, or Hi8 MP, ME type
Tape Speed (SP)	Approx. 20.051 mm/second
Recording Time Max (SP)	90 minutes (P5-90)
Video Output Level	1 Vp-p, 75 ohms unbalanced, negative sync.; S-video terminal;
Audio Output Level	Y signal 1.0 Vp-p, C signal 300 mVp-p (burst signal),
Microphone input	75-ohm unbalanced
Pickup Device	48 dB (with Rohde & Schwarz noise meter)
Microphone input	–8 dBs, impedance less than 2.2 kohms
Pickup	Electret condenser microphone, stereo type
Minimum required illumination	1/3" CCD image sensor
Lens	(approx. 470,000 pixels, including optical black)
Filter diameter	6 Lux*
Monitor	F2.0, f=5.8–46.4 mm, 8× power zoom, full-range auto focus
Power source	with macro function
Power consumption	37 mm
Colour temperature compensation	4" full-colour LCD screen (TFT active matrix)
Operating temperature	DC 6 V
Operating humidity	8.8 W during camera recording in Full Auto mode
Storage temperature	with Zoom motor off, backlight in normal mode, and DIS function off)
Dimensions (approx.)	Auto white balance with white balance lock
Weight (approx.)	0°C to +40°C
	30% to 80%
	–20°C to +60°C
	201 × 155 × 91 mm (W/H/D)
	995 g (without battery pack, lithium battery, and video cassette)

AC power adaptor/Battery charger specifications

Power requirement:	110–240 V, 50/60 Hz
DC output:	6.0 V
Power Consumption:	23 W
Dimensions (approx.):	70 x 44.3 x 165 mm (W/H/D)
Weight (approx.):	350 g

SUPPLIED ACCESSORIES

Standard battery pack (BT-BH70)	Shoulder strap	Audio/Video cable
AC power adaptor/battery charger	DC output cable	S-video cable
Infrared remote control unit	Lithium battery × 2	Cleaning cloth

OPTIONAL ACCESSORIES

Standard battery pack (BT-77, BT-BH70)
Car battery adaptor/charger (VR-P100CH)
Tuner pack (VR-HT10P)
Shoe adaptor (VR-30AD)
Wide conversion lens (VR-WC37P)
Sun hood (VR-400BF)
Soft cover (VR-400PC)
Sports housing (VR-400SP)
Weather resistant housing (VR-400SJ)
RF converter (VR-S30RF)

Battery pack for extended use (BT-80-BK, BT-BH85)
A/V output cable (VR-C21S) (21-pin Euro-SCART)
Video light (VR-30VL)
Tele-conversion lens (VR-TC37P)
Tripod adaptor for 180° recording (VR-FA100P)
Soft case (VR-30SC)
Thick shoulder strap (VR-400WS)
Waterproof housing (VR-400MP)
Cleaning kit (VR-30CK)

Design and specifications are subject to change without notice.

*Minimum illumination: Since there is no widely accepted testing procedure for determining minimum illumination capability, lux ratings are comparable only between models from the same manufacturer.

3. Handling of Ni-Cd battery

Please be noted that two types of battery are used in our CAMCORDER, and each of them should be handled in a different manner respectively: One is Ni-Cd battery employed in this model (and the other is conventional Sealed Lead-Acid battery).

1. Storage

- (1) The battery should be stored in normal room temperature and humidity. It will have a shorter life if it is placed and stored in high or low temperature.
- (2) Ni-Cd battery should be stored in discharged condition.
(On the contrary, Sealed Lead-Acid battery should be stored in full-charged condition.)

2. Charging

- (1) Battery charger must be a genuine one.
If a wrong charger is used, the electrodes (+ and -) will be damaged.
- (2) This Ni-Cd battery should be charged just before use.
For a longer life, keep it in discharged condition and charge it just before use.
(As for Sealed Lead-Acid battery, charge should be done periodically.)
- (3) Over charge should be avoided.
Over charging will affect the life of the battery. Attempting to charge a full-charged battery again in a short period (say within half a day) may result in an overcharge, causing a shorter life of the battery.
- (4) Charging in a hot place should be avoided.
As it will affect the life of the battery, charging should be done in a cool place.
If it is charged in a hot place, the battery may have abnormally high temperature, causing a shorter life of it.

Protect your environment!

Batteries must not be thrown into household waste; they need a special treatment.

Der Umwelt zuliebe!

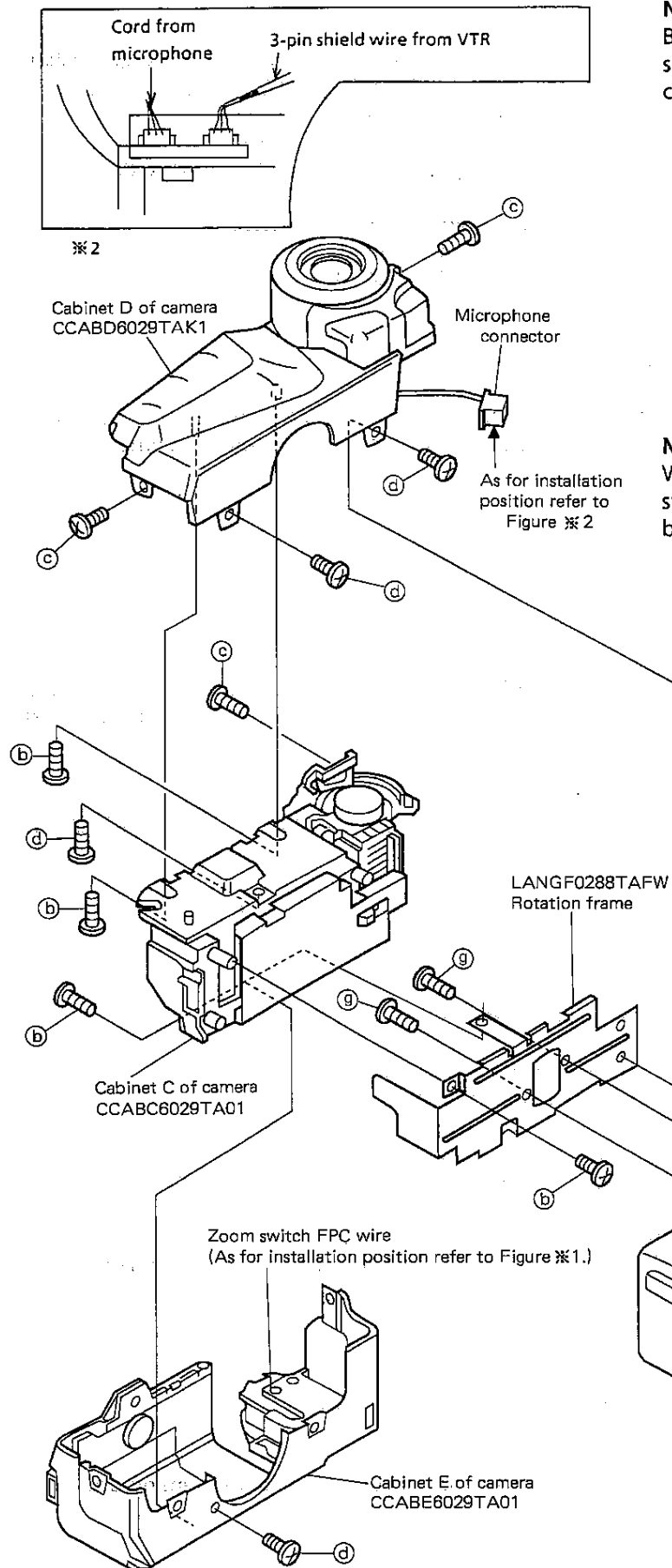
Batterien dürfen nicht mit den Siedlungsabfällen entsorgt werden, sondern verlangen Sonderbehandlung.

Pensez à votre environnement!

Ne pas jeter les piles avec les ordures ménagères, exige un traitement spécial.

5. DISASSEMBLY

5-1. DISASSEMBLING THE CABINET



5-1-1. REMOVING THE CASING

● REMOVING THE CAMERA SECTION

Note:

Before removing the cabinet, turn off the power supply, and ascertain that the battery is not connected.

1) Removing the cabinet E

Open the battery cover, and remove the two screws (b). Turn the VTR side by 90°, and remove the two screws (d) at a side. Then, remove the three screws (c), slightly pull the whole cabinet backward, and disconnect the zoom switch FPC wire from the connector.

2) Removing the cabinet D

Remove the two screws (b) inside the cabinet D. Remove the cabinet D from the VTR side, and remove the microphone connector.

Note:

When removing the cabinet D, do not pull it strongly. Or the microphone wire may be broken.

3) Removing the camera cabinet C

Remove the one screw (d) inside the cabinet C and the one screw (b) of rotation frame. Then, remove three pcs. of FPC at lower side of main body, and slide the battery terminal to withdraw. Remove the microphone shield wire connector. Remove the whole cabinet D from the rotation frame.

4) Removing the rotation frame

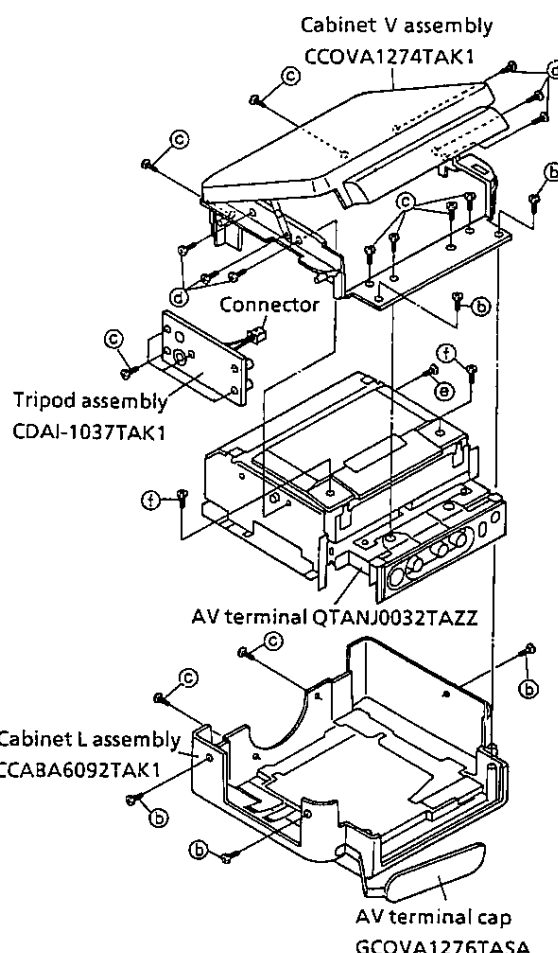
Remove the two screws (g) of rotation frame. To remove the rotation frame, pull it to this side.

● REMOVING THE VTR SECTION

- 1) Removing the VTR cover assembly
Remove the six screws "d" fixing the VTR cover assembly, and then remove the 5 screws "b" fixing the cabinet A assembly and VTR cover assembly. Remove the 6 screws fixing the VTR cover assembly. After that, withdraw upward the VTR cover assembly.
- 2) Removing the tripod assembly
Remove the four screws "c" fixing the tripod withdraw upward the tripod assembly, and remove the connector.
- 3) Removing the cabinet A assembly
Remove the two connectors provided near the tripod. Then, remove the screw "e" fixing the inverter transformer unit. After that, remove the two screws fixing the cabinet L assembly. Remove the AV terminal cap fitted to the AV terminal, and withdraw upward the VTR mechanism unit.
Remove the FPC of inverter unit from the connector.

Note:

Be careful when removing of the VTR mecha unit since too much force may cause the FPC wire breaking of the inverter unit



● REMOVING THE HL400U CASSETTE COMPARTMENT

- 1) Eject the cassette compartment.
Mount the power supply unit (battery or AC adapter with DC cable) without removing the cabinet A, open the VTR of cabinet, and press the EJECT button to eject the cassette compartment.

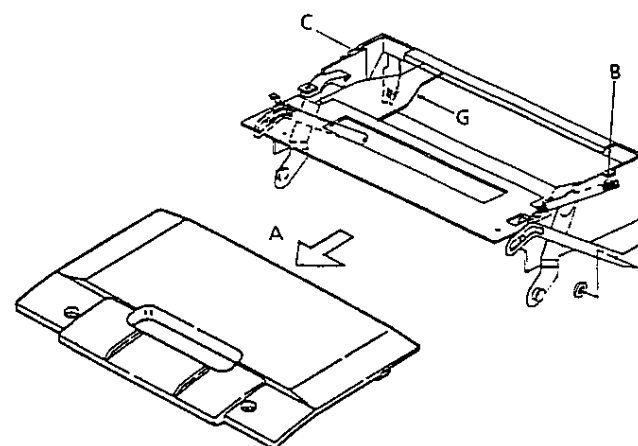
Note:

When mounting or removing the cassette compartment cover, be sure to eject the cassette compartment in advance.

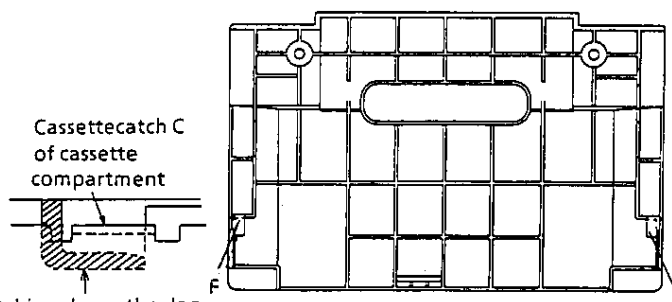
- 2) Remove the two screws fixing the cassette compartment cover, and slide the cassette compartment cover in the direction A to remove it from the cassette compartment.

Note:

When mounting the cassette compartment cover, ascertain that the cassette compartment cover catches B and C of cassette compartment shown above are engaged with the dogs of cassette compartment cover as shown in View G.



Cassette compartment cover



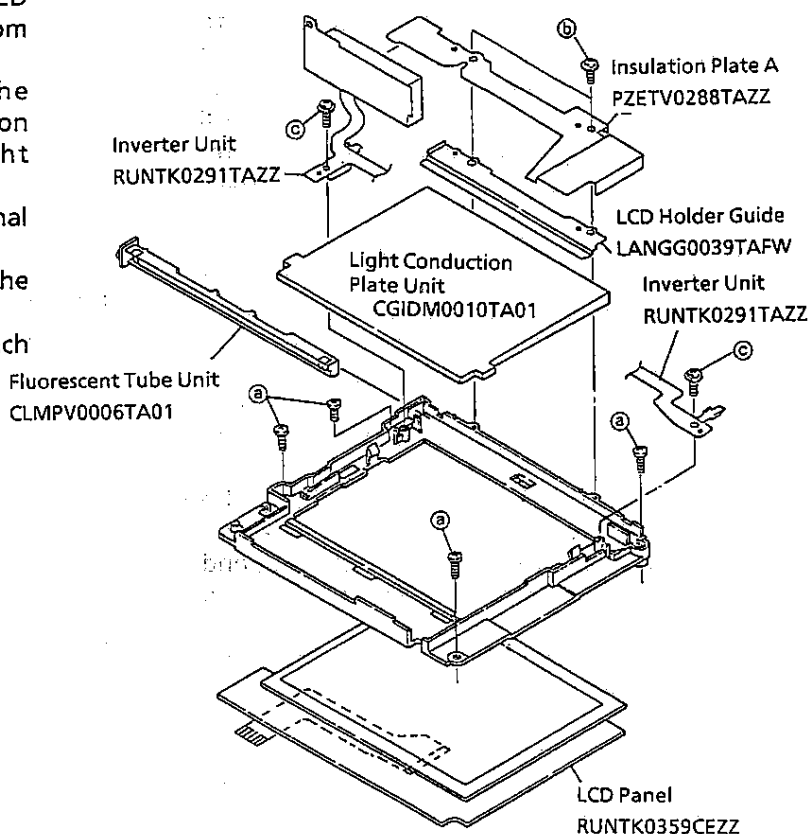
The hatching shows the dog of cassette compartment cover.

View G

Rear view of cassette compartment cover

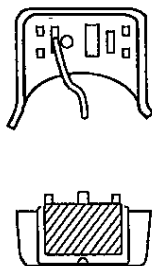
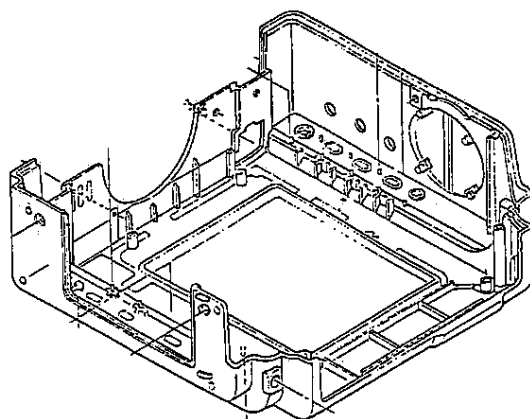
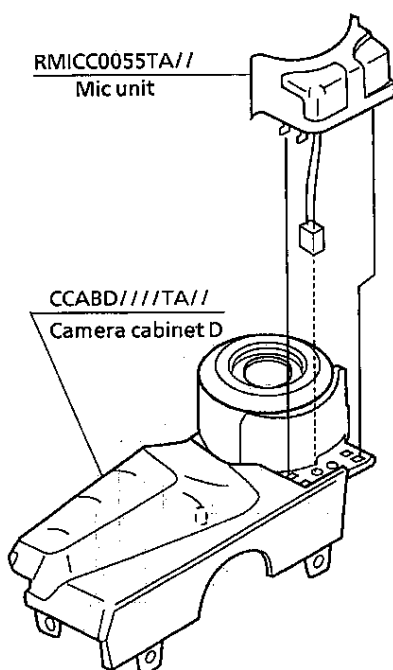
● REMOVING THE LCD UNIT

- 1) Unscrew four screws (a) fixing the LCD holder assembly to detach the unit from the cabinet.
- 2) Unscrew two screws (b) fixing the insulation plate to remove the insulation plate, LCD holder guide and light conduction plate unit.
- 3) Unscrew two screws (c) fixing the terminal of the inverter unit to detach the unit.
- 4) Pull off the fluorescent tube unit from the L holder.
- 5) Release the clicks of the L holder to detach the LCD panel.



● CAUTION FOR MIC REMOVAL

Be cautious enough not to damage the mic when it is removed since the sticky double-faced tape is used in the oblique part as shown in the figure below.



6. TROUBLESHOOTING**6-1. POWER CIRCUIT TROUBLESHOOTING**

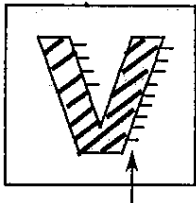
No.	Trouble	Possible cause
1	Power cannot be supplied.	1) There is no voltage on TL953 or voltage is too low. → Check the fuse F901, battery, and AC adapter. 2) Voltage is not applied to the IC900 (20), (21), and (22) pins, or voltage is too low. → Check the system control circuit. 3) Check waveform on the IC900(17) pin and IC901(2) pin with oscilloscope. Triangular wave of about 600 mVp-p, 480 kHz is not found. → Check the periphery of IC900(14), (15), (16), and (17) pins. 4) Connect the oscilloscope to TL732, and check that voltage of about 4.9V is obtained soon after the power supply is turned on. If voltage of about 4.9V is obtained, proceed to the step of item 6). If voltage of about 4.9V is not obtained, proceed to the step of item 5). 5) Check for short-circuiting between TL732 and TL954 with the aid of tester. If short-circuit is found: → Load short-circuit of P-CON 4.9V line and PB4.9V line If short-circuit is not found: → Proceed to "P-CON4.9V check" of No.2. 6) Connect the oscilloscope to TL748(16.5V), TL3466(-8V), TL3467(13V), and TL742 (-16V), and check that 16.5V, -8V, 13V, and -16V is obtained soon after power supply is turned on. If each specified voltage is obtained: → Check the system control circuit. If each specified voltage is not obtained: → Proceed to the step of item 7). 7) Check for short-circuiting between TL954 and TL748, TL742, TL3466, TL3467, and TL742, respectively, with the aid of tester. If short-circuit is found: → Load short-circuit of specific line If short-circuit is not found: → Proceed to "16.5V, 13V, -8V, -16V check" of No.3.
2	P-CON 4.9V check	1) Check whether about 6V is applied to the Q903 emitter. If about 6V is applied: → Proceed to the step of item 2). If about 6V is not applied: → Check L900. 2) Using the oscilloscope, check that the Q903 base is set to L level (lower than emitter voltage by more than 0.6V) soon after power supply is turned on. If L level is set: → Proceed to the step of item 3). If L level is not obtained: → Check the IC900(4), (5), (6), (7), (8), (47), (48), and (1) pins and peripheral circuit. 3) Using the oscilloscope, check that the Q903 collector is set to H level (about 6V) soon after power supply is turned on. If H level is set: → Check L901, L902, L903, L904, L905, and check periphery of R934 and R935. If H level is not obtained: → Check Q903.

No.	Trouble	Possible cause
3	Check 16.5V, 13V, -8V, -21V and -12V.	1) Check that about 6V is applied to the Q908 emitter. If about 6V is applied: → Proceed to the step of item 2). If about 6V is not applied: → Check L906, F902. 2) Using the oscilloscope, check that pulse appears soon after power to the Q908 base is turned on. If pulse appears: → Proceed to the step of item 3) If pulse does not appear: → Check the IC901 (1), (2), (3), (4), (5), (6), (7), and (8) pins and peripheral circuit. 3) Using the oscilloscope, check that pulse (about 12 Vp-p) appears soon after power to the Q903 collector is turned on. If pulse appears: → Check D901, D902, L907, L908, L909, and L910. If pulse does not appears (or level is too low): → Check Q908, Q917, T900.
4	LCD output failure	1) Check whether 12.6V is found on TL3467. If 12.6V is found: → Check the LCD circuit. If 12.6V is not found: → Check Q909 and peripheral circuit. Check for 13V line short-circuiting.
5	Camera EE output failure	1) Check whether about 4.45V is found on TL741. If about 3.3V is found: → Proceed to the step of item 4). If about 3.3V is not found: → Proceed to the step of item 2). 2) Check whether about 6V is applied to the Q915 emitter. If about 6V is applied: → Proceed to the step of item 3). If about 6V is not applied: → Check L914. 3) Using the oscilloscope, check that the Q903 base is set to "L" level (lower than emitter voltage by more than 0.6V) approx. 200 msec after power is turned on. If L level is set: → Check L912 and L913. Check periphery of L950 and R951. If L level is not set: → Check IC900 (2), (3), (9), (10), (11), (12), (13), (43), and (44) pins and peripheral circuit. 4) Check whether about 4.9V is found on the TL740 pin. If about 4.9V is found: → Proceed to the step of item 3). If about 4.9V is not found: → Proceed to the step of item 2). 5) Check whether the Q907 base is set to "L" level. If "L" level is set: → Check Q907, L912 and L913. Check for short-circuiting of CAM 4.9V line. If "L" level is not set: → Check Q912 and system control circuit. 6) Check whether TL748 is set to 16.5V and TL742 is set to -16V. If specified voltages are found: → Check the camera circuit and Y/C circuit. If specified voltages are not found: → Check Q912, Q913, Q914, peripheral circuit, and system control circuit.

6-2. Y/C SYSTEM TROUBLESHOOTING

(Y SIGNAL SYSTEM)

No.	Trouble	Possible cause
1	No screen indication 1. EE mode (VTR terminal, S terminal)	1) Check that the input/output selection is set to OUTPUT. (MENU screen) 2) Check that the control signal from the MECHACON controller is sent to the IC401(47) to (49) pins. If not, check the MECHANICAL control circuit. 3) Ascertain that the CAM Y signal is output to the IC1401(25) and (17) pins. 4) Check the CAM Y signal [or Y + C signal for (36)] in order of IC401(30) pin - (34) pin - (32) pin - (36) pin. 5) Check that the CAM-Y signal is output to TP1403 and the camera C signal is output to TP1404. 6) Check that the CAM Y + C signal is output to TP1402 and TP1401.
	2. Standard tape (Hi-8 tape) playback mode	1) Check EE screen. 2) Check that the playback FM signal is sent to the connector P35 (4) pin. (Approx. 300 mVp-p) If not, check the head amplifier circuit and RF circuit Q3402 to Q3405. 3) Check the playback FM signal on IC3402(42) pin. (Approx. 100 mVp-p) 4) Check the playback FM signal on the IC3402(46) pin. (Approx. 450 mVp-p) 5) Check the playback FM signal on the IC3402(11) pin. (Approx. 450 mVp-p) 6) Check the playback FM signal on the IC401(41) pin. (Approx. 450 mVp-p) 7) Check the FM demodulation Y signal on the IC401(7) pin. (150 mVp-p between sync chip and white 100%) 8) Check the playback Y signal in order of TP402 - TP403 - IC401(34) pin. (Signal level of about 0.5 Vp-p)
	3. Standard tape (normal tape) playback mode	1) The same as stated in item 2. 1), 2) "Standard tape (Hi-8 tape) playback mode 2) Check the playback FM signal on the IC3402(41) pin. (Approx. 500 mVp-p) 3) Check the playback FM signal on the IC3401(45) pin. (Approx. 500 mVp-p) 4) Check the playback FM signal on the IC3402(14) pin. (Approx. 150 mVp-p) 5) Check the playback FM signal on the IC3402 (16) pin. (Approx. 200 mVp-p) 6) Check the playback FM signal on the IC401(41) pin. (Approx. 200 mVp-p)

No.	Trouble	Possible cause
1	4. Self-record/ playback mode (recording is impossible)	1) Check in the EE and standard tape playback modes. 2) In the CAM record mode check the CAM Y signal in order of TP402 - TP403. (Approx. 0.5 Vp-p) 3) Check the REC FM signal on TP404. 4) Check the REC FM signal of R322 of head amplifier circuit and the REC MIX (REC-C + REC-AFM + REC-AFT) signal of R323. (Voltage waveform is not seen since current input is applied to the (7) pin of IC301.) 5) Check the record current on the connector P35(1) pin of head amplifier circuit. (Approx. 300 mVp-p) 6) When Hi-8/normal control signal is set to Hi-8, ascertain that High is input to the (25) pin of IC3402 from the IC1701.
2	Display fault in self- record/playback mode  Black fault	1) Ascertain adjustment (recording system). (Especially, carrier deviation, Y/C recording current) 2) Check the PB Y FM signal level of (4) pin of (playback system) connector P35. (Approx. 300 mVp-p) If the level is not found, check the head amplifier circuit and RF circuit Q3402 to Q3405. 3) In the Hi-8 mode check the playback FM signal level of IC3402 (42) and (11) pins. (Approx. 100, 450 mVp-p). Check especially pins (2), (3), (8), (44), and (46) also check the external part of pins (11) and (13). (Crack, breakage, etc.) 4) Check the playback FM signal level of the IC401(7) pin.
3	Self-record/playback noise	1) The same as stated in items 2-1), 2), 3), and 4). 2) Use the cleaning tape to clean the clogged head.
4	Periodic appearance of noise on playback screen	1) Check the AFT error signal of IC1701 (60) pin in the playback mode. 2) Check that the REC ATF signal is sent to R323 of head amplifier circuit in the record mode.
5	Recorded character is not displayed.	1) Check that the LCD circuit is operating normally. (Especially, HD output of IC801 (12) pin and VD output of (15) pin) 2) Check that the VD and HD signals are sent to the IC704 (19) and (20) pins. 3) Check that the recorded character signal is output to the IC704(14) and (15) pins and IC1401(16) and (18) pins.

(Color signal system)

No.	Trouble	Possible cause
1	No color indication	
	1. Camera EE mode	1) Does the chroma signal appear at IC1401 pins (29) and (15)? → Check pin (24) H and pin (16) L. 2) Does the chroma signal appear at IC402 pins (7) and (1). → Check IC402 pins (7) and (1) external parts. Check IC402 pin (5) L. 3) Does the chroma signal appear at IC401 pins (64) and (36)? At pin (36), Y + C → Check the voltage at Q445, IC401 pin (36)~(38) external parts. 4) Does the chroma signal appear at IC401 pin (8). (Low pass conversion chroma)? → Check the voltage at pins (51), (52), (54), (57), (59) external parts.
	2. Standard tape playback mode	1) Check at the step 1) Camera EE mode. 2) Does the chroma signal appear at IC401 pin (45)? (YFM + C signal; 1V _{p-p}) → Check Q446, Q2402 and Q2420. 3) Is the chroma signal at IC401 pin (23) normal? → Does the 4.43 MHz subcarrier appear at Q437 emitter, the H-SW-P at pin (46), and the CSYNC at pin (24)? 4) Does the chroma signal appear at IC401 pins (21) and (63)? → Check Q426, IC403, Q448, Q425, Q424 and Q423. 5) Does the chroma signal appear at IC402 pin (6)? → Check Q454, Q455, IC2401 pins (2) and (15), Q2403 and Q2409. 6) Does the chroma signal appear at IC401 pin (64)? → Check IC402 pin (1) and Q445. Check that IC402 pin (5) is H.
	3. Self record/ playback mode	1) Camera EE mode 2) Standard tape playback 2) Check the REC chroma signal appears at IC401 pin (8). 3) Check the REC chroma signal appears at IC406 pin (3). 4) Check the REC chroma signal appears at Head amp Test 2 connector pin (1). → Check Q3406.

6-3. AUDIO CIRCUIT TROUBLESHOOTING

No.	Trouble	Possible cause
1	Audio signal is not recorded.	1) Check that the audio signal is input into the IC603(27) and (34) pins in the camera EE mode. 2) Check that A-FADE and A-MUTE-H are set to "L" in the record mode. 3) Check that the FM signal (approx. 200 mVp-p) is sent to TP603. 4) Check "fo" adjustment.
2	Playback audio signal is not output.	1) Check that the envelope (approx. 10 mVp-p) is input into the IC603(79) pin and (63) pin, and check for loss. 2) Check that A-MUTE-H is set to "L". 3) Check that audio signal is output to TP616 and TP613.
3	Speaker audio signal is not output.	1) Check that headphone audio signal is output. Yes: Check that NON REG 6V is applied to the IC6403(2) pin while the headphone is disconnected from the headphone jack. Ascertain that HP ON and SP CTL are set to "H". No: Check that audio signal is output to TP616 and TP613. Check that VOL CTL voltage changes in the range of 0 to 4.9V when the volume button is pressed.
4	Stereo recording is impossible.	1) Check that the ST/MONO signal is set to "H". Yes: Check "fo" adjustment. No: Check that the MiC MONO signal is set to "H" in the camera mode. Check the JACK MONO signal is set to "L" during line input recording (when cable is connected to the L/R pin jack) in the VTR mode.
5	Audio signal is output from the speaker even when headphone is connected.	1) Check that the HP ON signal is set to "L" when the headphone is connected.

6-4. SYSTEM CONTROL SECTION TROUBLESHOOTING

Disposal of errors (if the same trouble occurs after power supply resetting, perform the following operation)

No.	Error indication	Corrective action
1	E007	● Set the SENSOR-OFF mode [set the servicing adjustment jig SW2 (sensor OFF) to ON], and perform FF or RW. 1) Check that the pulse as shown below is input into the IC1701(75) pin. → If such a pulse is input, IC1701 is defective. 2) Check that the pulse shown above is output from the IC1705(12) pin. → If such a pulse is output, check soldering of IC1705(12) pin. 3) Check that sine wave of 50 mVp-p is input into the IC1705(9) and (10) pins with the same period as that of pulse shown above. a. If the sine wave is input, check soldering of all pins of IC1705, R1783 and C1790. b. If the sine wave is not input, check soldering of SC30 connectors (1) to (4).
2	E011	● Check that voltage is applied to both ends of loading motor when playback is started in halt state after the sensor-off mode is set. 1) If voltage is applied: a. Check whether there is undue mechanical engagement. b. Check for contact failure of connector P33. 2) If voltage is not applied: a. Check that the forward rotation and reverse rotation signals are sent to the IC1701 (21) and (22) pins. → If these signals are not sent, check soldering of SC26(1) pin and R724. b. Check that there is an output from the IC1704(18) and (3) pins. → If there is no output, check whether about 6V is supplied to the IC1704 (8) pin. → If there is an output, check soldering of Q1708 and R1773.
3	E012	1) Perform the same check as that stated in No.2 above.

No.	Error indication	Corrective action
4	E020	● Set the playback state in the sensor-off mode, and check that the drum is rotating. 1) If the drum is rotating: a. Check that the DRUM FG pulse of IC1701(67) pin is input. → If the pulse is input, IC1701 is defective. b. Check that the DRUM FG pulse is output from the IC1706(22) pin. → If the pulse is output, check soldering of IC1706(22) pin. c. Check that D FG (50 mVp-p sine wave) is input into the IC1706 (22) pin. → If input is found, IC1706 is defective. → If input is not found, check soldering of connector SC29(3) and (4) pins and IC1706 (16), (19) pins. 2) If the drum does not rotate: a. Check that DRUM VS (about 1.6V or more) is supplied to the IC1706(5) pin. → If it is supplied, check whether voltage on the IC1706(6) pin is about 6V DC. → If approx. 6V DC is not obtained, check soldering of Q702. → If approx. 6V DC is obtained, check soldering of all pins of IC1706. b. Check that DRUM ERR (about 1.3V DC) is supplied to the IC900(25) pin. → If DRUM ERR is supplied, check the power circuit. c. Check whether the DRUM D/A(2.5V DC bias) pulse is input into the IC1707(2) pin. → If the pulse is input, check soldering of IC1707(1) to (7), (24) to (29) pins, C1719 to C1727, R1784, R1794, R1739, R1749 and 1740. → If the pulse is not input, check soldering of R1719 and IC1701(72) pin.
5	E025	● Execute playback or FF in the sensor-off mode. 1) Check that the take-up reel pulse is input into the IC1701(57) pin. a. If the pulse is input, IC1701 is defective. b. If the pulse is not input, check soldering of IC1703(1), (2) and (3) pins, SC31(11) and (15) pins.
6	E026	● Rewind in the sensor-off mode. 1) Check that the feed reel pulse is input into the IC1701(58) pin. a. If the pulse is input, IC1701 is defective. b. If the pulse is not input, check soldering of IC1703(5), (6) and (7) pins and SC31(2) and (5) pins.

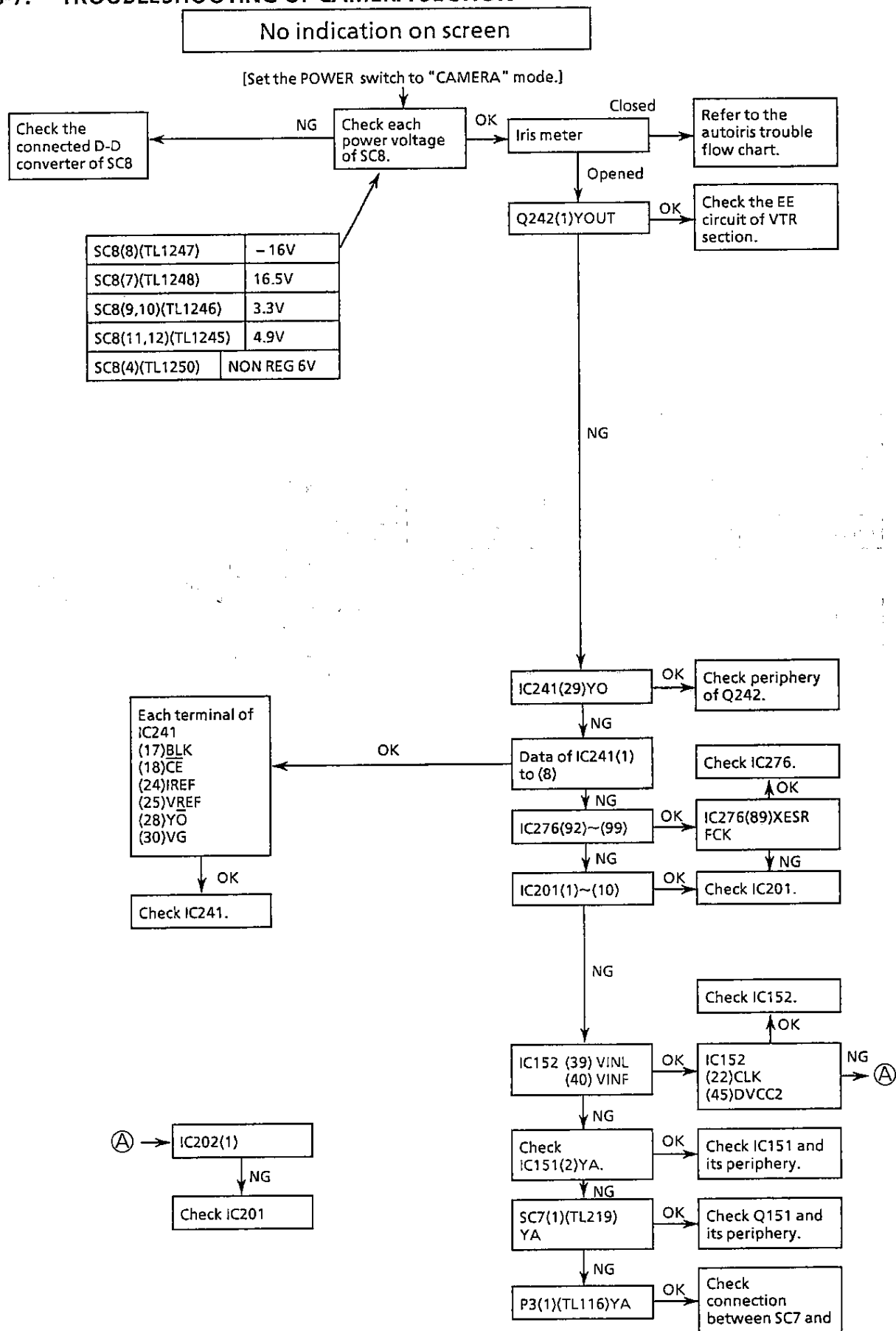
6-5. SERVO SECTION TROUBLESHOOTING

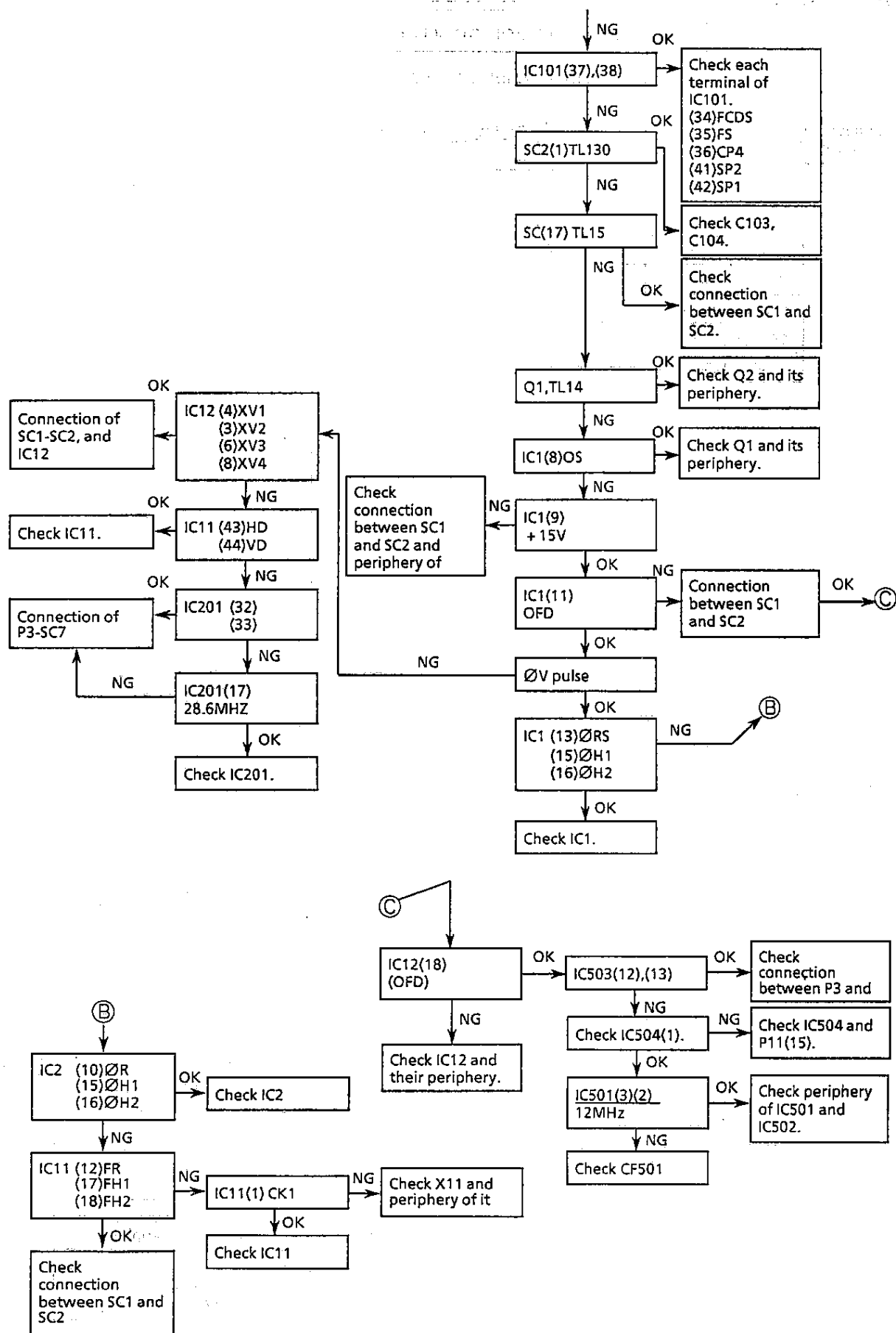
No.	Trouble	Possible cause
1	Tape runs away in the playback or record mode.	1) CAP FG is not input into the IC1701(68) pin. → Check soldering of IC1706 and peripheral circuit. → Check that 5V DC is supplied to the SC30(2) pin. 2) CAP ERR voltage (usually 1.2V DC) is excessively high. → Check IC1701(73) pin CAP PWM waveform. → Check soldering of IC706 peripheral circuit. 3) Trouble in power circuit → Check for soldering failure and short-circuiting of CAP VS and CAP ERR line.
2	The tape does not run in the playback or record mode.	1) Check whether the tape is caught. 2) CAP VS voltage is low (usually 2.1V DC). → The same check as stated in item 1-2), 3).
3	Noise or screen distortion in vertical direction in the playback mode	1) The AFT ERR waveform input into the IC1701(60) is not normal. → Check soldering of IC1702 and peripheral circuit. → Check that PB RF is sent to the IC1702(2) pin. → Check soldering of RF, head amplifier circuit.
4	Horizontal synchronization is disturbed.	1) The DRUM FG waveform input into the IC1701(67) pin is not normal. 2) The DRUM PG waveform input into the IC1701(66) pin is not normal. → Check soldering of IC1705 and peripheral circuit. → Check soldering of SC29.

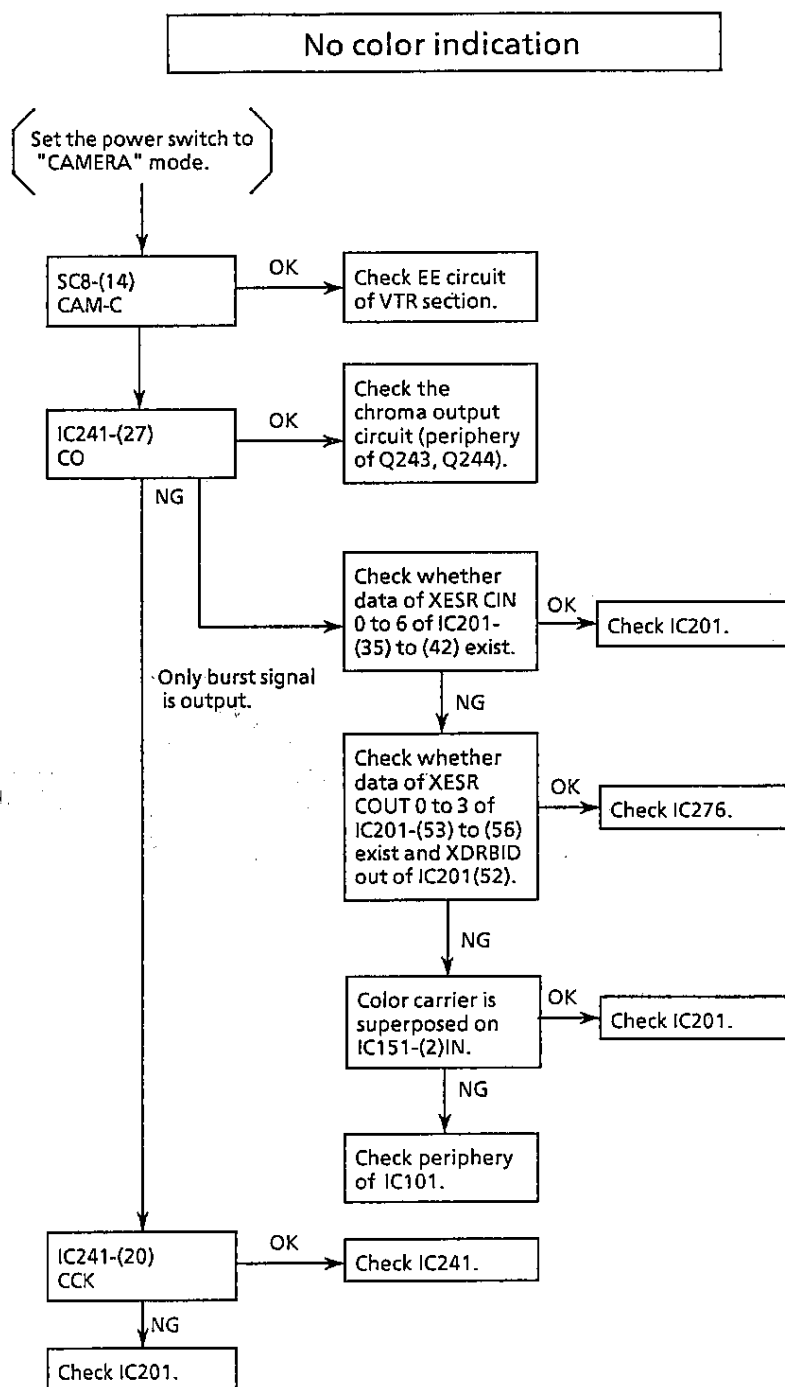
6-6. HEAD AMPLIFIER TROUBLESHOOTING

No.	Trouble	Possible cause
1	Picture cannot be recorded.	1) Check that signal is normally input into R322(REC-Y), R323(REC-MIX) of head amplifier circuit. Check that the control signal is normally input into specific terminal of IC. [IC301(17):L, (28), (29):H] 2) Check that the record current is normal at the terminal of TES 2. 3) Check that the record current is output at the (2), (44), (41) and (35) pins of IC301. 4) Check that the VTR head wire is not broken.
2	Playback signal is not output.	1) Check that the control signal is normally input into the specific terminal. [IC301(17):H, (28), (29):L] 2) Check that the VTR head wire is not broken. 3) Check that waveform is not obtained on FE of SC34(15) pin. 4) Clean the head with the cleaning tape.
3	Erasing is impossible.	1) Check that the Q1301 base is set to High in the record mode. 2) Check that the collector output of Q1304 is about 9Vp-p and the period is about 0.14 μs in MP tape setting state. (MP tape: about 6Vp-p, period of about 0.14 μs.) 3) Check that the erase head wire is not broken.

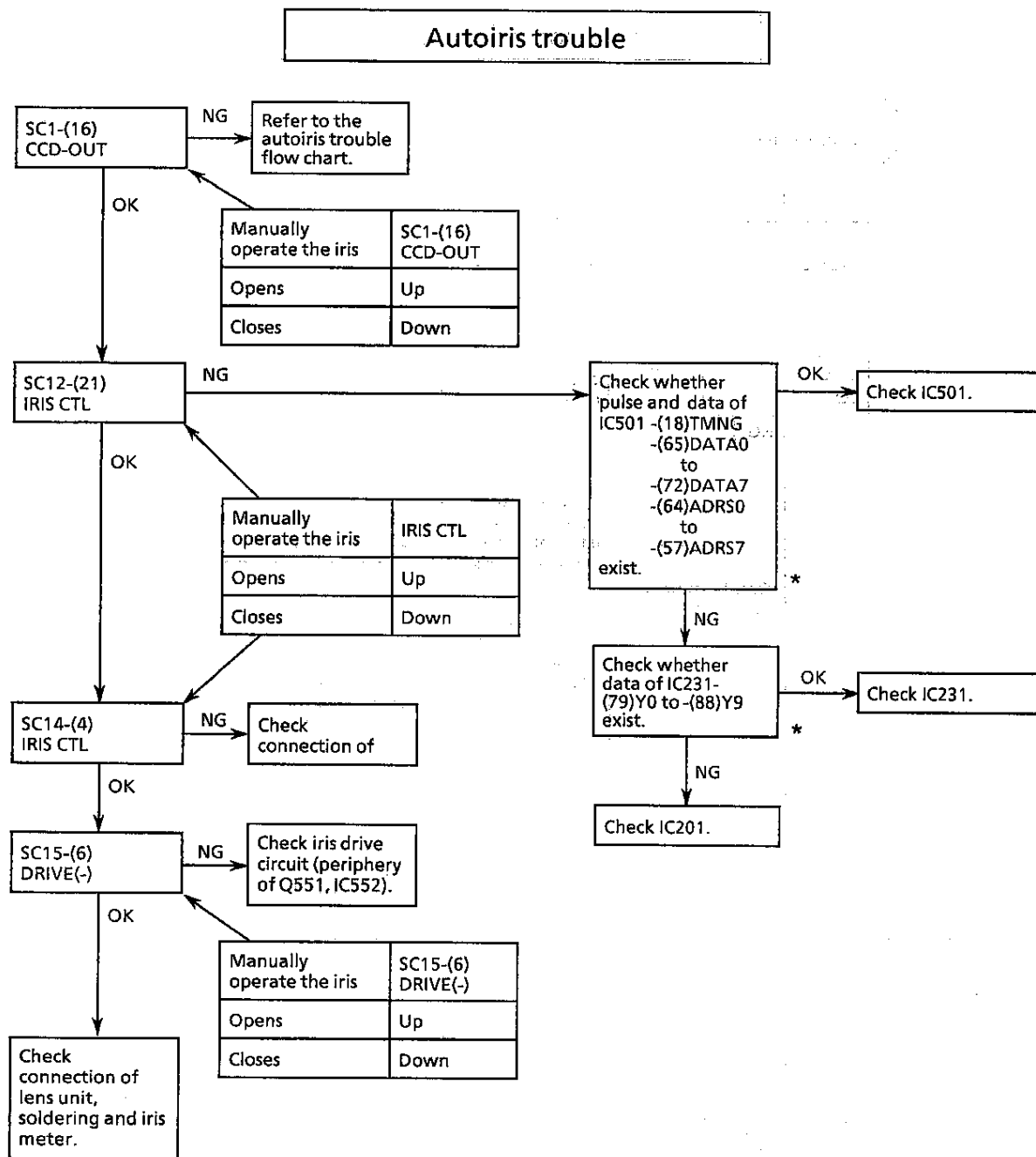
6-7. TROUBLESHOOTING OF CAMERA SECTION





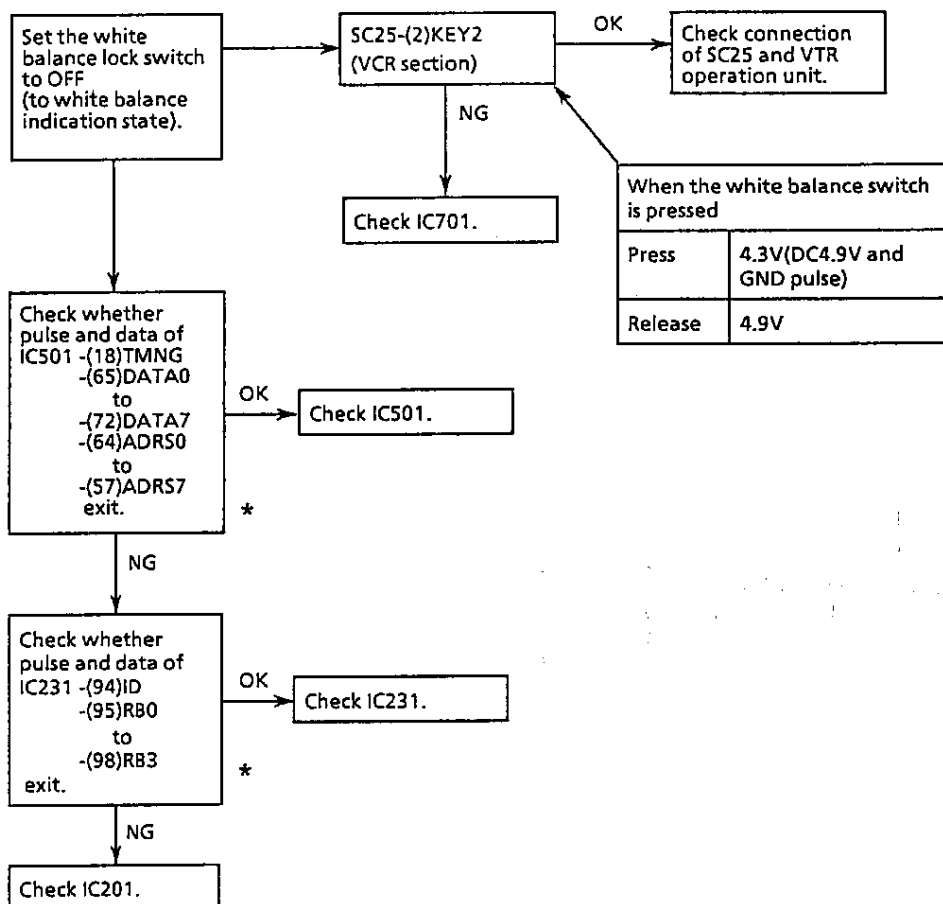


* To check XESR CIN and XESR COUT data buses, shoot a colored object with camera, and change this object to see whether the digital signal changes.

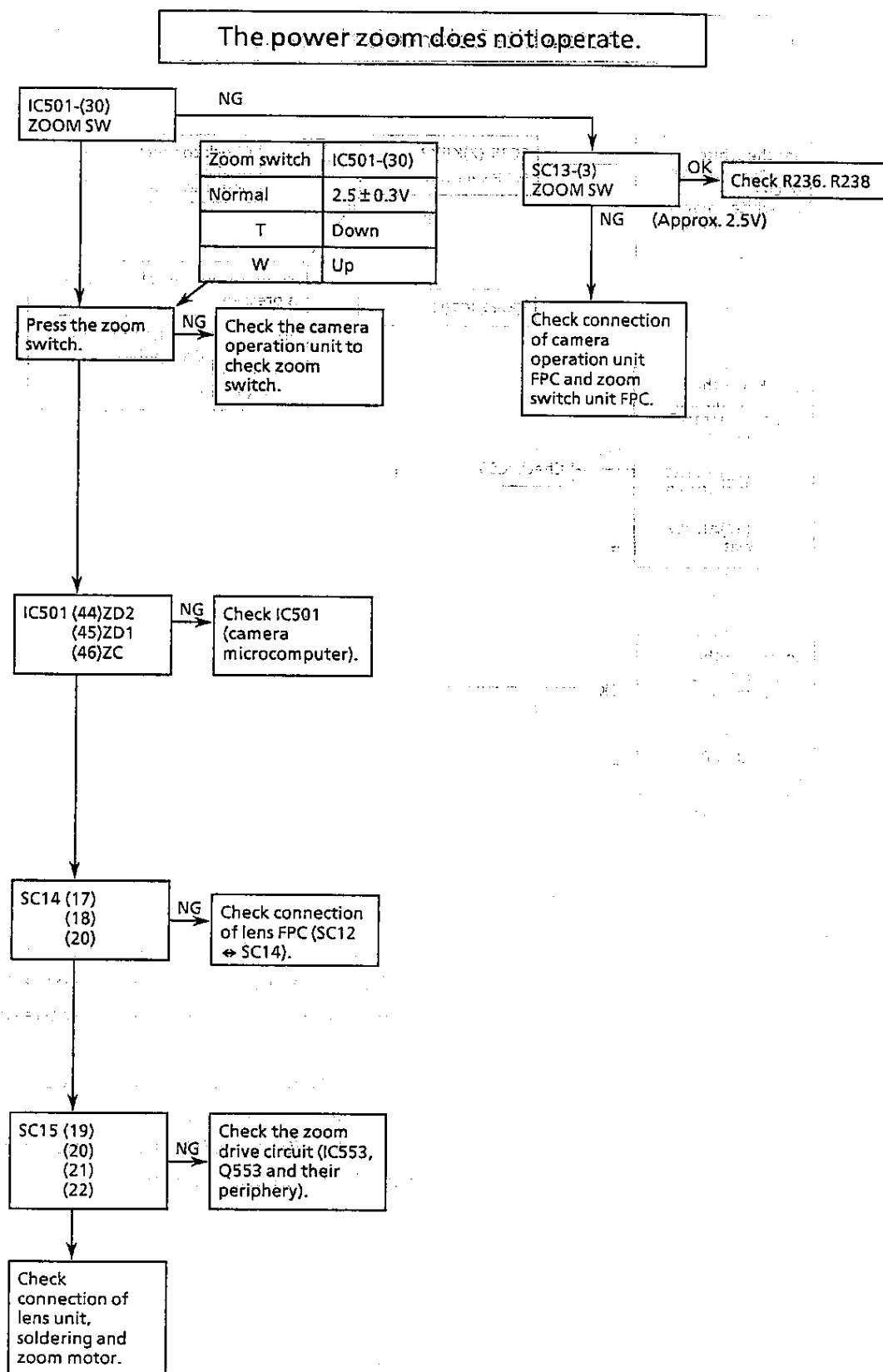


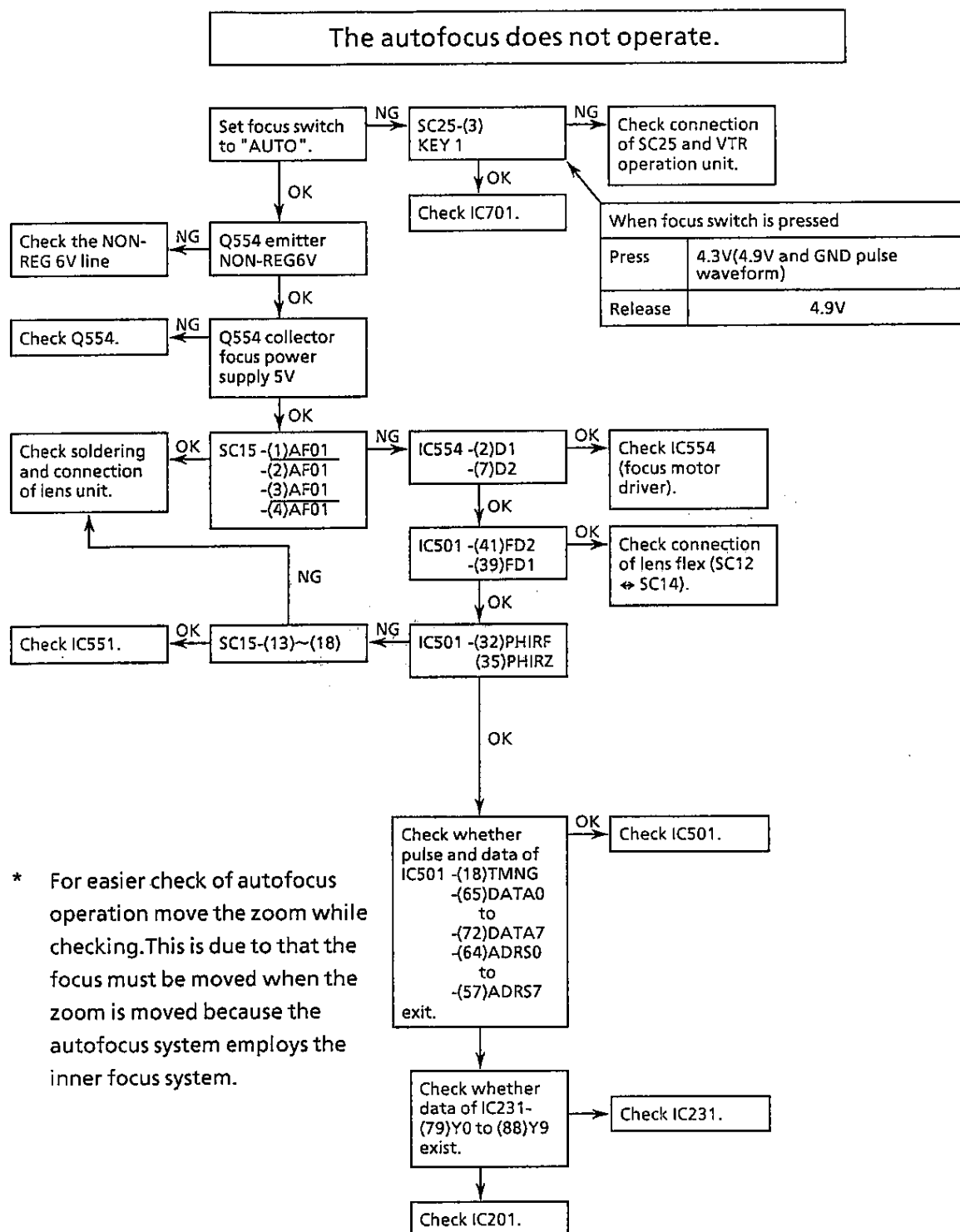
- * 1. To check data of IC501 DATA 0 to DATA7 and IC231 Y0 to Y7, check whether the digital signal changes when the object is changed.
2. To check IC501-(18)TMNG, check whether VD period pulse is output.
3. To check IC501ADRS 0 to ADRS7, check whether pulse is output.

Autowhite balance is abnormal.

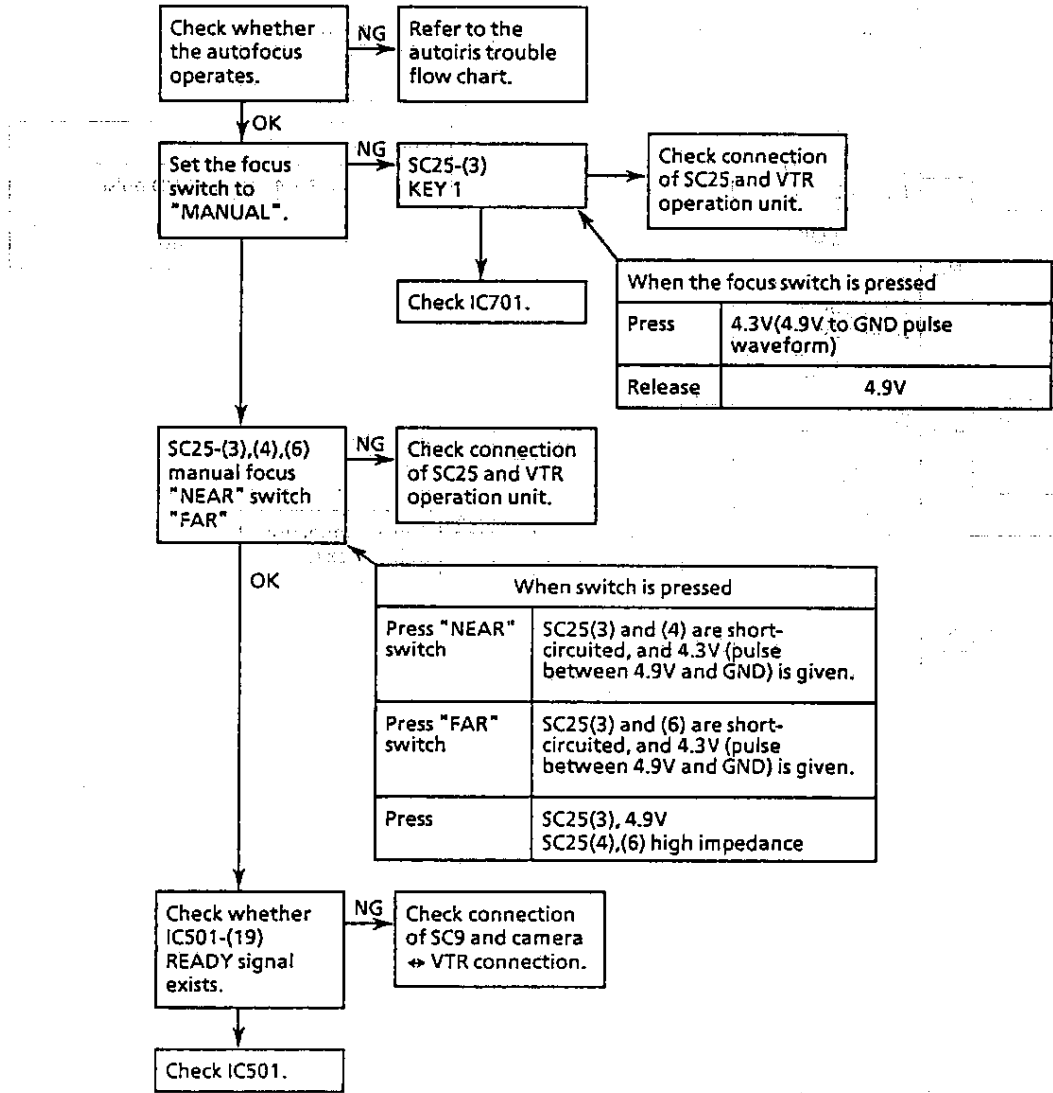


- *1. To check data of IC501 DATA 0 to DATA 7 and IC231 RB0 to RB3, shoot a coloured object with camera, and move it to see whether the digital data changes.
- 2. To check IC501:TMNG, IC231:ID, check that pulse waveform is output.
- 3. To check IC501ADRS 0 to ADRS7, check whether pulse is output and changes.

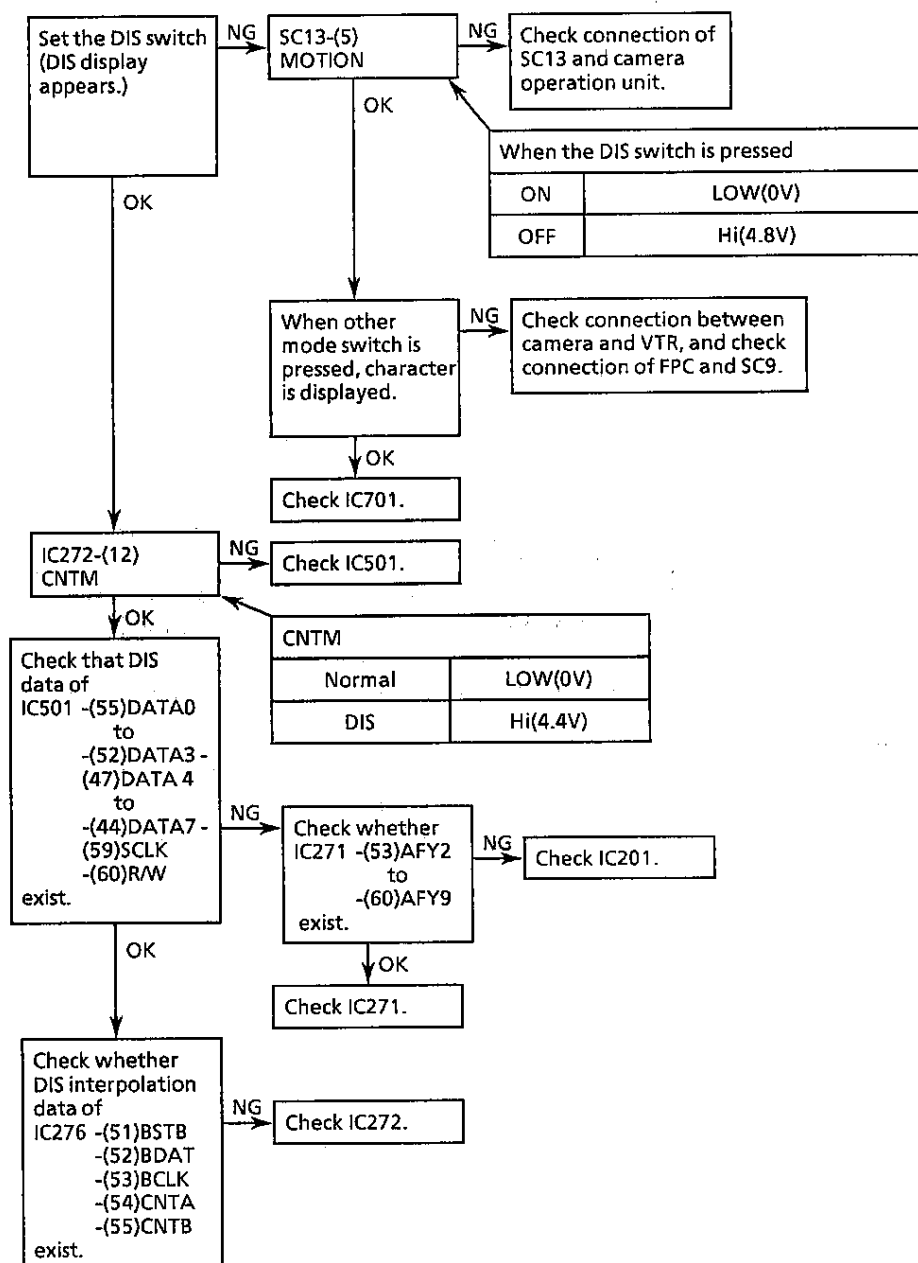




The manual focus does not operate.



The DIS is inoperative.



6-8. LCD DISPLAY TROUBLESHOOTING

No.	Trouble	Possible cause
1	Normal picture is not displayed.	(1) The backlight does not light. → The (6) pin connector for LCD PWB and backlight inverter unit is incorrectly fitted (SC47) or the backlight inverter unit (RUNTK0291TAZZ) or backlight unit (CLMPV0006TA01) is defective. → If voltage is not applied to the (1) pin of connector SC47, the fuse F903 has blown out or the power circuit (Q919, IC901) peripheral circuit is malfunctioning. → When the backlight lights if the backlight brightness selection switch is set to "BRIGHT", the power circuit (Q919, IC901) peripheral circuit is malfunctioning. (2) Picture is abnormal. → If video input signal of TP800 is abnormal, the Y/C circuit is malfunctioning. → If the R, G, and B output signals (TP804, TP803, TP802) of IC800 are abnormal, IC800 and peripheral circuit are malfunctioning. → The (18) pin connector for LCD PWB and LCD panel is fitted incorrectly (SC46), FPC wire has been broken or LCD panel is defective. → If power supply (4.9V, -8V, 13V, -16V) of LCD circuit is abnormal, the power circuit of VTR PWB is malfunctioning. → If the LCD common bias level (TP806) is abnormal, IC804, Q803, Q804 and peripheral circuit are malfunctioning.
2	Synchronization cannot be stabilized.	(1) Synchronization signal TP805 is abnormal. → Malfunction of IC800 or peripheral circuit. (2) TP809 PDP signal is abnormal. (Horizontal synchronization is disturbed.) → Malfunction of IC801 and VCO circuit (L805, D806, IC803) (3) Vertical synchronization is disturbed. → Malfunctioning of IC801 and vertical synchronization separation circuit (Q801) (4) The horizontal picture display position is abnormal. → Malfunction of IC801 and horizontal position compensation circuit (D816)
3	Color does not appear.	(1) Abnormal chroma VCO oscillation → IC800 and chroma peripheral circuit are malfunctioning or the crystal X800 is defective. (2) IC800 (47) pin external horizontal sync signal is abnormal. → IC801, VCO circuit and peripheral circuit are malfunctioning. (3) IC800 R, G and B output signals (TP804, TP803, TP802) are abnormal. → Malfunction of IC800 and chroma peripheral circuit. (4) When the color density is changed, voltage of color gain control terminal IC800(11) pin does not change. → Malfunction of Y/C-D/A converter circuit. (IC5403)

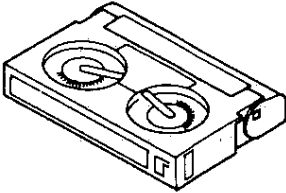
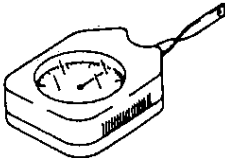
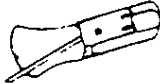
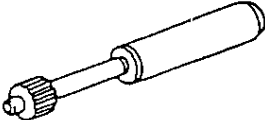
No.	Trouble	Possible cause
4	Abnormal color The color phase shading at each line is large. (Line crawl is large.)	(1) In the burst phase adjustment, the 3 pin DC voltage of the variable capacitor diode (D817) does not change. → Malfunction of Y/C-D/A converter circuit. (IC5403) (2) In the burst phase adjustment, the above Voltage Changes and the phase shading does not become small. → Malfunction of ic800 and D817
5	ON-SCREEN (NON REC character) does not appear.	(1) The IC801(12) pin HD signal and IC801(15) pin VD signal are not output or abnormal. → Malfunction of IC800 and peripheral circuit (2) The OSR, OSG, OSB, NON REC BLK signals are not output or abnormal. → Malfunction of IC704 and peripheral circuit (3) Although the NON REC BLK signal is input into the IC800(1) pin, ON-SCREEN does not appear. → IC800 is defective.
6	ON-SCREEN (NON REC character) color does not appear.	(1) The OSR, OSG and OSB signals are not output. → IC704 and peripheral circuit (2) The OSR signal is input into the IC800(5) pin and ON-SCREEN RED does not appear. The OSG signal is input into the IC800(4) pin, and ON-SCREEN GREEN does not appear. → Malfunction of IC800 (3) ON-SCREEN white character is not white. Malfunction of IC800 and ON-SCREEN peripheral circuit.
7	LCD indication	(1) Vertical inversion is not performed. → If H/L switching of LCD REV signal is disabled, mounting of LCD REV SW or connector P27 is improper. → If the LCD REV signal is switched correctly, the IC801 or LCD panel is defective.

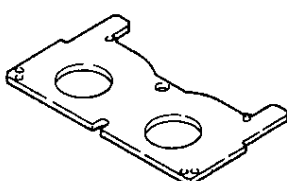
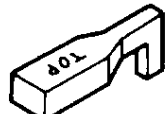
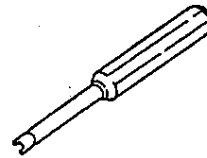
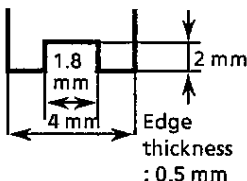
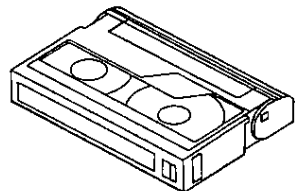
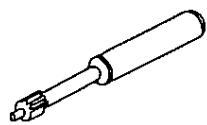
7. ADJUSTMENT, REPLACEMENT AND ASSEMBLY OF MECHANICAL UNITS

7-1. MECHANISM CHECKING/ADJUSTING JIGS, TOOLS, AND PARTS

7-1-1. MECHANISM CHECKING/ADJUSTING JIGS AND TOOLS

Note: N indicates the new jigs.

No.	Name	PART No.	Code	Configuration	Remarks	Note
1.	Cassette Torque Meter for PB	JiG8T-012	CV		• (10 g·cm/25 g·cm)	
2.	Cassette Torque Meter for VS-REW	JiG8T-032	CV		• (50 g·cm/25g·cm)	
3.	Torque Gauge (45 g·cm)	JiGTG0045	CN		• Used for loading brake torque measurement.	
4.	Torque Gauge Head	JiGTH-MX7U	BS		• Used on the torque gauge listed above.	
5.	Dial Tension Gauge (10 g)	JiGDT-10G	BW			
6.	Lock Brake Measuring Reel	—	—		• $\phi 20$ mm with a string (See page 7-3.)	—
7.	Tension Gauge (400 g)	JiGSG0400	BK		• Used for measuring the pinch roller pressure.	
8.	Pinch Roller Pressure Measuring Tape	—	—		• $\phi 20$ mm (60-mm length), 8-mm width (See page 7-3.)	—
9.	Gear Type Driver	JiGDRIVERMX7U1	BL		• Used for manually operating the mechanism.	
10.	Torque Driver (1.5 kg·cm)	JiGTD1500RTDH	CB			

No.	Name	PART No.	Code	Configuration	Remarks	Note
11.	Torque Driver (0.2 kg-cm)	JiGTD-200AMLD	**		Minus-shaped bit, 0.14 mm (Edge thick.) × 1.5 mm (Width)	—
12.	Master Plane	JiGMP-MX7U	CG		- Used for Tu guide height adjustment. - Used for T roller verticality check. - Used for Reel disk height check.	
13.	Height Adjusting Jig	JiGGH-MX7U	BV		- Used for Tu guide height adjustment. - Used for T roller verticality check.	
14.	Guide Roller Height Adjusting Driver	JiGDRIVERHMX7U	BU		Bit shape (See the Fig. below.) Tolerance : ± 0.1 mm 	
15.	Alignment Tape ★	Y/C, Audio ADJ. JiGWR5-9CS	BR			
		Y/C ADJ. JiGWR5-8CSE	BY			
		Transit ADJ. JiGWR2-1CP or VR2CBOPS	CS			
16.	T Roller Position Adjusting Driver	JiGDRIVERMX7U2	BN			
17.	Others (1) Calipers (2) High-precision screwdrivers (Plus and minus) (3) Radio pliers (With thin jaws) (4) A pair of tweezers	—	—			—

★Note:

JiGWR2-1CP and JiGWR5-1CP are compatible.

To use them, Perform the running adjustment according to the Service Manual for VL-MX75/H/X/MX98E.

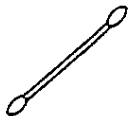
<Making the mechanism check/adjustment jigs>

For jig item No 6 and 8 listed on the preceding page

1. Lock brake force measuring jig
 - 1) Prepare an 8 mm cassette tape commercially available.
 - 2) Use the reel around which the tape is wound clockwise. Make the tape winding diameter 20 mm.
 - 3) Fix a 200-250 mm long thread (thin enough to come into the hole of the dial tension gauge's measuring probe) at the end of the tape with Scotch tape or the like.

* It is practical to use the end hole of the tension gauge when measuring.
2. Pinch roller pressure measuring tape
 - 1) Prepare an 8 mm tape commercially available.
Cut it to about 60 mm long.
 - 2) Fix both ends of the tape with Scotch tape or the like to form a circle as shown above.

7-1-2. PARTS FOR PERIODICAL INSPECTION AND MAINTENANCE

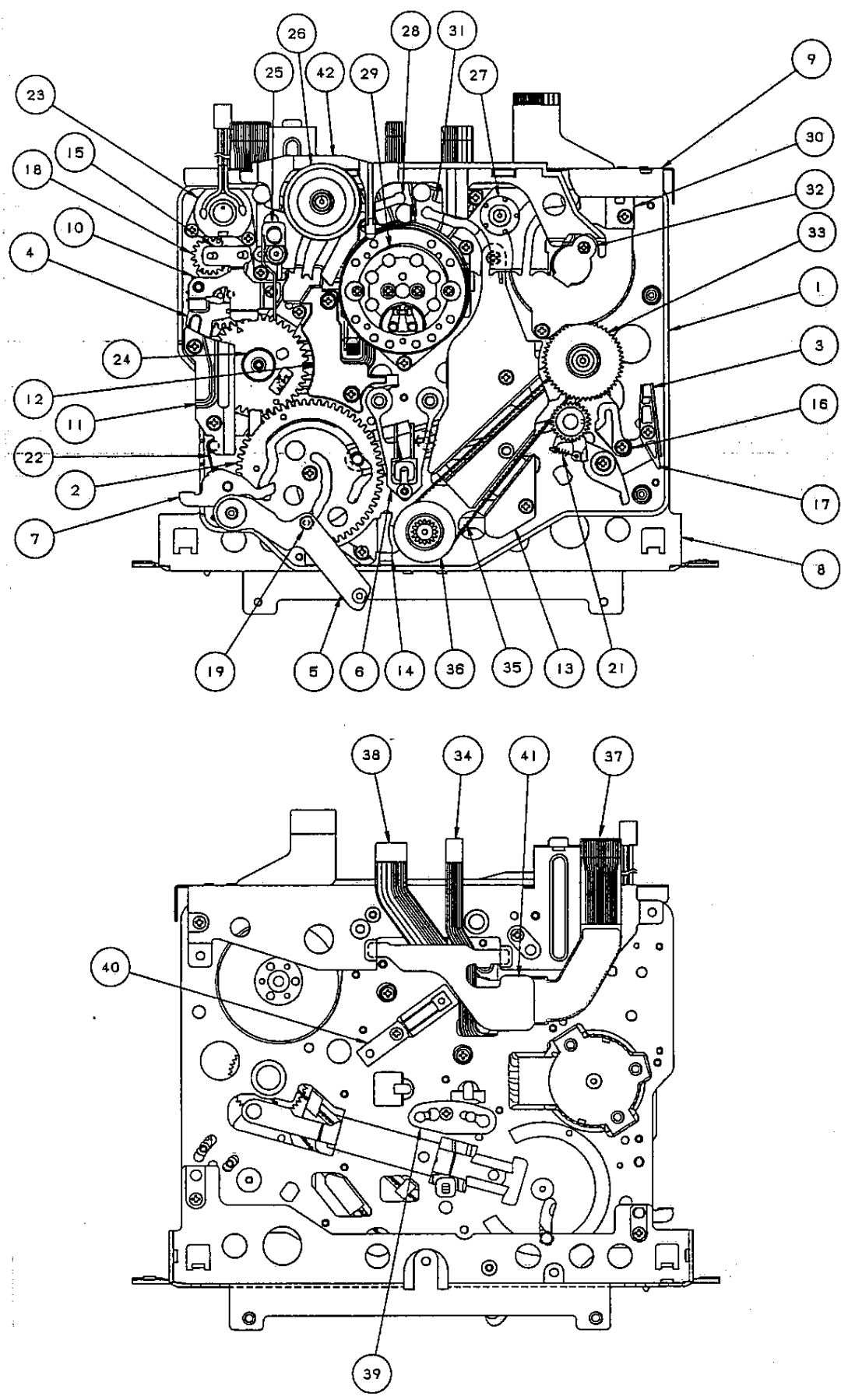
No.	Name	PART No.	Code	Configuration	Remarks	Note
1.	Oil ① COSMO HYDRO HV22 ② COSMO HYDRO HV100	—	—	—	• COSMO PETROLEUM CO., LTD.	
2.	Cleaning Paper	JIGDUSPER	AP		• DUSPER Σ (Sigma) of OZU Co., Ltd.	
3.	Superfine Swab	—	—			
4.	Grease (MORYCOAT X5-6020)	—	—	—	• DOW COATING	
5.	Screw Locking Agent (1401B)	—	—	—	• THREE BOND	
6.	Cleaning Liquid (Industrial-Use Ethyl Alcohol)	—	—	—		

7-2. MECHANICAL PARTS LIST

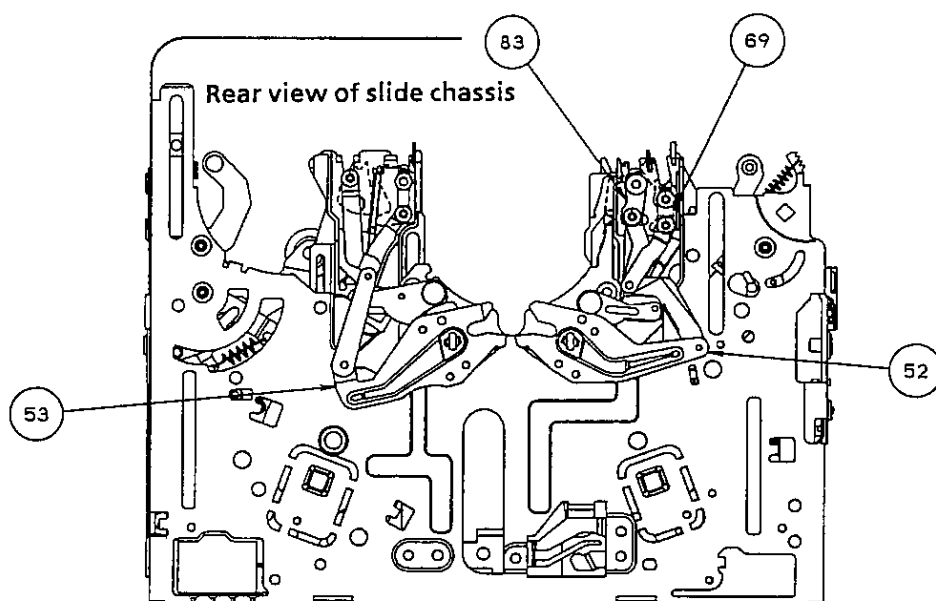
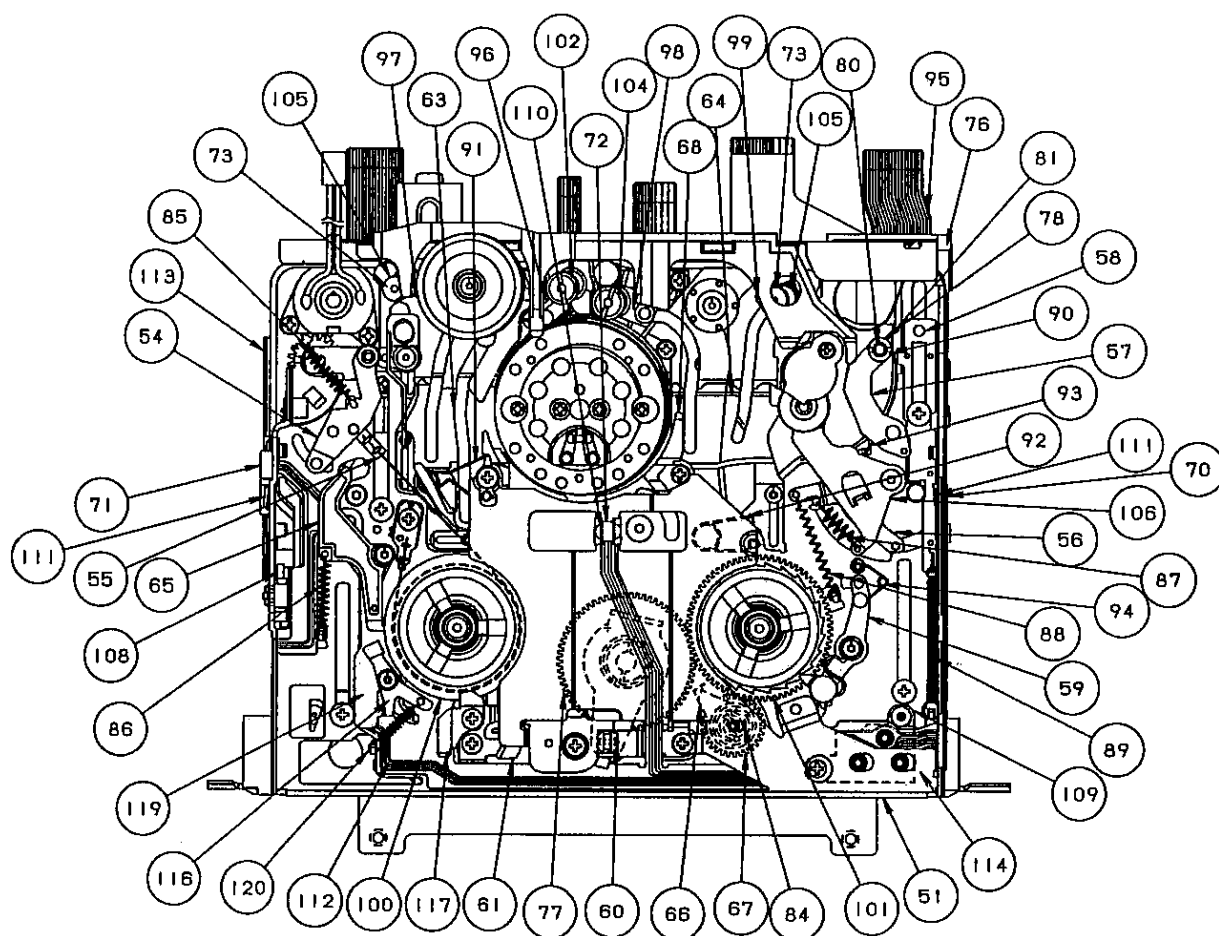
No.	Name	No.	Name
1	Main chassis 2 ass'y	62	Down-SW retaining angle
2	Main cam	63	Slide rail L
3	Pinch drive lever ass'y	64	Slide rail R
4	T arm operating lever 2 ass'y	65	Main brake
5	SL chassis drive lever	66	Lock brake lever
6	Loading pressure lever ass'y	67	Lock brake gear
7	Eject lever 2	68	PB protector
8	HL mechanism frame F	69	PBS2 slider
9	HL mechanism frame R	70	Start sensor holder
10	T cam	71	End sensor holder
11	T arm rail L	72	LED spacer
12	S loading arm support	73	GRT2 cap
13	T loading arm support		
14	SL chassis drive lever support		
15	T cam holder	76	Relay FPC retainer
16	EOT operation lever guide	77	Swing arm ass'y
17	P guide rail	78	Tu guide
18	Loading gear ass'y		
19	Cam roller	80	Tu guide upper flange
		81	Tu guide lower flange
21	EOT release lever spring		
22	Eject lever spring	83	PBS1 slider
23	Loading motor ass'y	84	Lock brake spring
24	Mode SW	85	T arm spring
25	S stopper -H ass'y	86	Main brake spring
26	SI roller ass'y	87	Pinch pressure spring
27	TS roller ass'y	88	Pinch release spring
28	Drum base ass'y	89	Tu guide operating spring
29	Drum ass'y	90	Tu guide adjusting spring
30	Tu stopper ass'y	91	Slide rail L spring
31	PBT1 holder spring	92	Slide rail R spring
32	Capstan motor	93	Tu guide arm spring
33	Relay gear ass'y	94	Tu ratchet spring
34	Dew sensor ass'y	95	Relay FPC-L 2
35	Timing belt	96	Pole base S1 ass'y
36	Drive gear	97	Pole base S2 ass'y
		98	Pole base T1 ass'y
		99	Pole base T2 ass'y
39	Pressing lever holder	100	S reel disk ass'y
40	Earth brush ass'y	101	Tu reel disk ass'y
41	FPC holder	102	Guide roller S1 ass'y
42	Tape guide		
		104	Guide roller T1 ass'y
		105	Guide roller T2
		106	Pinch roller lever ass'y
		107	Damper
		108	Cassette control down SW
		109	Recognition SW -T
		110	Cassette LED
		111	S/E sensor
51	Slide chassis ass'y	112	Sensor FPC ass'y
52	S loading arm ass'y	113	SL guide angle
53	T loading arm ass'y	114	LED holding angle
54	Tension arm ass'y	115	Down guide
55	Tension wire ass'y	116	L brake
56	Pinch double acting lever ass'y	117	Reel stopper
57	Tu guide arm ass'y	118	Dumper retainer
58	Tu holding guide operating plate	119	L brake operation lever
59	Tu ratchet ass'y	120	L brake spring
60	Reel lock release angle ass'y		
61	Slide adjusting angle	130	Cassette control ass'y

VL-H400S/H/X
VL-H9E

MAIN CHASSIS ASS'Y



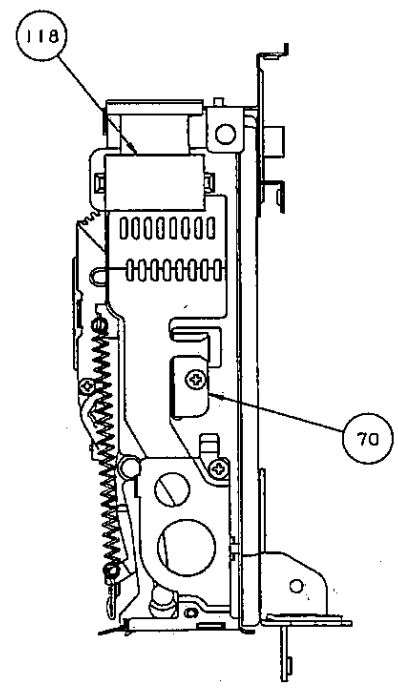
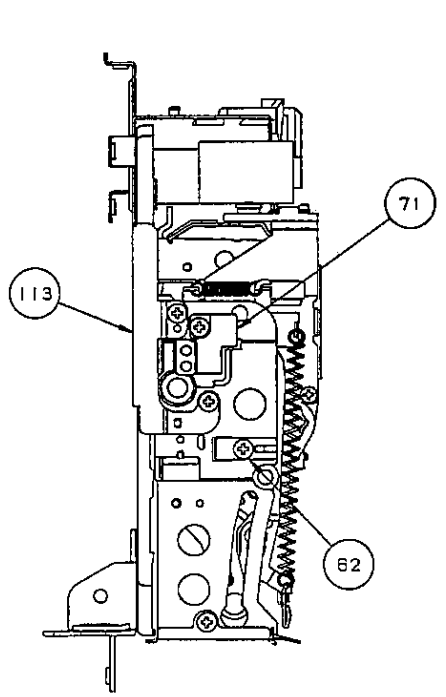
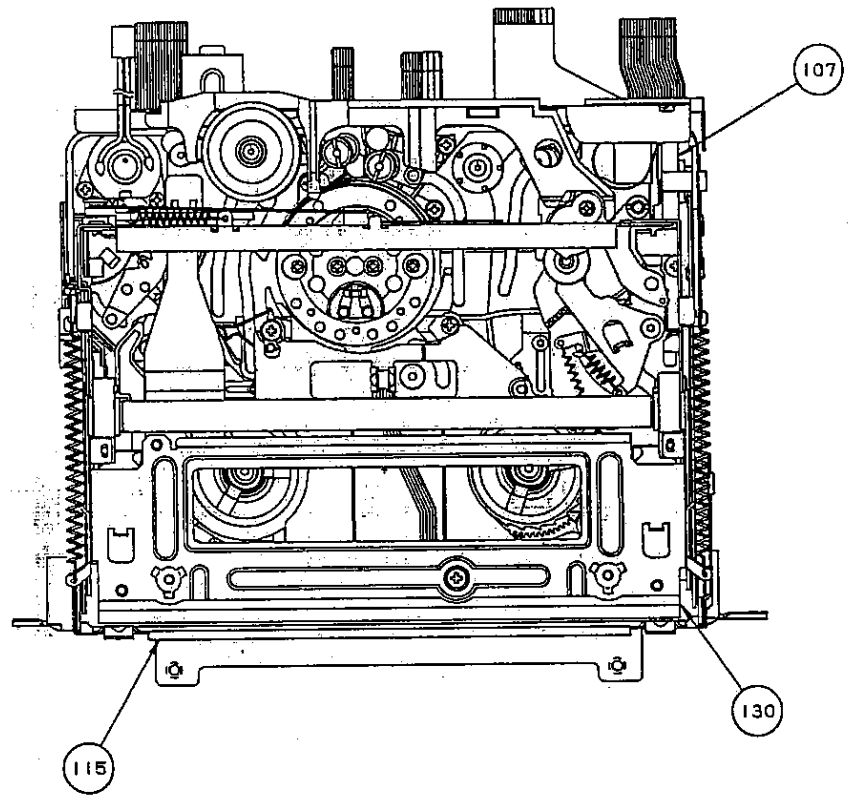
SLIDE CHASSIS ASS'Y



VL-H400S/H/X
VL-H9E

OTHER PARTS

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 841. 842. 843. 844. 845. 846. 847. 848. 849. 850. 851. 852. 853. 854. 855. 856. 857. 858. 859. 860. 861. 862. 863. 864. 865. 866. 867. 868. 869. 870. 871. 872. 873. 874. 875. 876. 877. 878. 879. 880. 881. 882. 883. 884. 885. 886. 887. 888. 889. 890. 891. 892. 893. 894. 895. 896. 897. 898. 899. 900. 901. 902. 903. 904. 905. 906. 907. 908. 909. 910. 911. 912. 913. 914. 915. 916. 917. 918. 919. 920. 921. 922. 923. 924. 925. 926. 927. 928. 929. 930. 931. 932. 933. 934. 935. 936. 937. 938. 939. 940. 941. 942. 943. 944. 945. 946. 947. 948. 949. 950. 951. 952. 953. 954. 955. 956. 957. 958. 959. 960. 961. 962. 963. 964. 965. 966. 967. 968. 969. 970. 971. 972. 973. 974. 975. 976. 977. 978. 979. 980. 981. 982. 983. 984. 985. 986. 987. 988. 989. 990. 991. 992. 993. 994. 995. 996. 997. 998. 999. 1000.



7-3. ITEMS AND TIMINGS OF INSPECTION AND MAINTENANCE

The mechanism of the VCR requires the below described periodical inspection and maintenance work in order that it maintains its high quality. Also, whenever you repair the machine, give it the below listed maintenance and checkings after the repair, regardless of how long it has been used.

7-3-1. INSPECTION AND MAINTENANCE LIST

| | Checking/
Maintaining Point | Hours the VCR Was Used | | | | | Possible Symptom
Encountered | Remarks |
|--------------------|--|------------------------|------|------|------|------|---|---|
| | | 500 | 1000 | 1500 | 2000 | 3000 | | |
| Tape travel system | Tape traveling route
(See Section 7-3-2.) | □ | □ | □ | □ | □ | <ul style="list-style-type: none"> • Lateral noise. • Unclean head. • Screen shakes. | Rollers:
<ul style="list-style-type: none"> • If found rotating abnormally or deflecting too much, replace the roller. Other than rollers:
<ul style="list-style-type: none"> • Clean the tape contacting areas. Be sure to use the specified cleaning agent. |
| | Drum (See Section 7-3-3.) | □ | □ | □ | □ | □ | | |
| | Video head | □ | □○ | □ | □○ | □○ | <ul style="list-style-type: none"> • Unsatisfactory SN ratio. • No colour appears. | |
| Driving system | Timing belt | — | ※ | — | ※ | ※ | <ul style="list-style-type: none"> • Tape does not travel. • Tape slackens. • Screen shakes. | <ul style="list-style-type: none"> • Replace if found having a trouble. |
| | Pinch roller | □ | □ | □ | □○ | □ | | |
| | Capstan D.D. motor | — | — | — | ○ | — | | |
| | Relay gear shaft | — | △ | — | △ | △ | <ul style="list-style-type: none"> • Unusual sound. | <ul style="list-style-type: none"> • Apply oil. (Oil: COSMO HYDRO HV100) |
| | Drive gear shaft | — | △ | — | △ | △ | | |
| | Loading motor | — | — | — | ※○ | — | <ul style="list-style-type: none"> • Not ejectable. • Does not get into mode. | <ul style="list-style-type: none"> • Replace if found having a trouble (such as abnormal sound or other). |
| Performance check | Abnormal sound | ※ | ※ | ※ | ※ | ※ | | |
| | PB/VS-REW take-up torque | — | ※ | — | ※ | ※ | | <ul style="list-style-type: none"> • If not adjustable within the standard range, replace. |
| | PB/VS-REW back tension torque | — | ※ | — | ※ | ※ | | |
| | Loading brake | — | ※ | — | ※ | ※ | | |
| | Lock brake | — | △ | — | △ | △ | | |

○: Replace. □: Clean. △: Apply oil. ※: Check.

Oil: COSMO HYDRO HV22 or HV100
 Grease: MORYCOAT X5-6020
 Screw locking agent: THREE BOND 1401B
 Cleaning liquid: Industrial-use ethyl alcohol

7-3-2. CLEANING THE TAPE TRAVEL SYSTEM

- 1) Clean the tape travel areas (i.e. the points ① thru ⑫, pinch roller, capstan shaft, and lower drum) with a superfine swab with the cotton wound on the ends dry.
- 2) If dry cleaning does not remove dirt, use the superfine swab soaked to the desired degree with cleaning agent (industrial-use ethyl alcohol).

Notes:

1. When cleaning the rollers, exercise due care not to let any foreign matter or cleaning liquid get into the roller shaft areas.
2. Do not soak the swab with too much cleaning liquid. Excessive amount of cleaning liquid may cause a trouble.

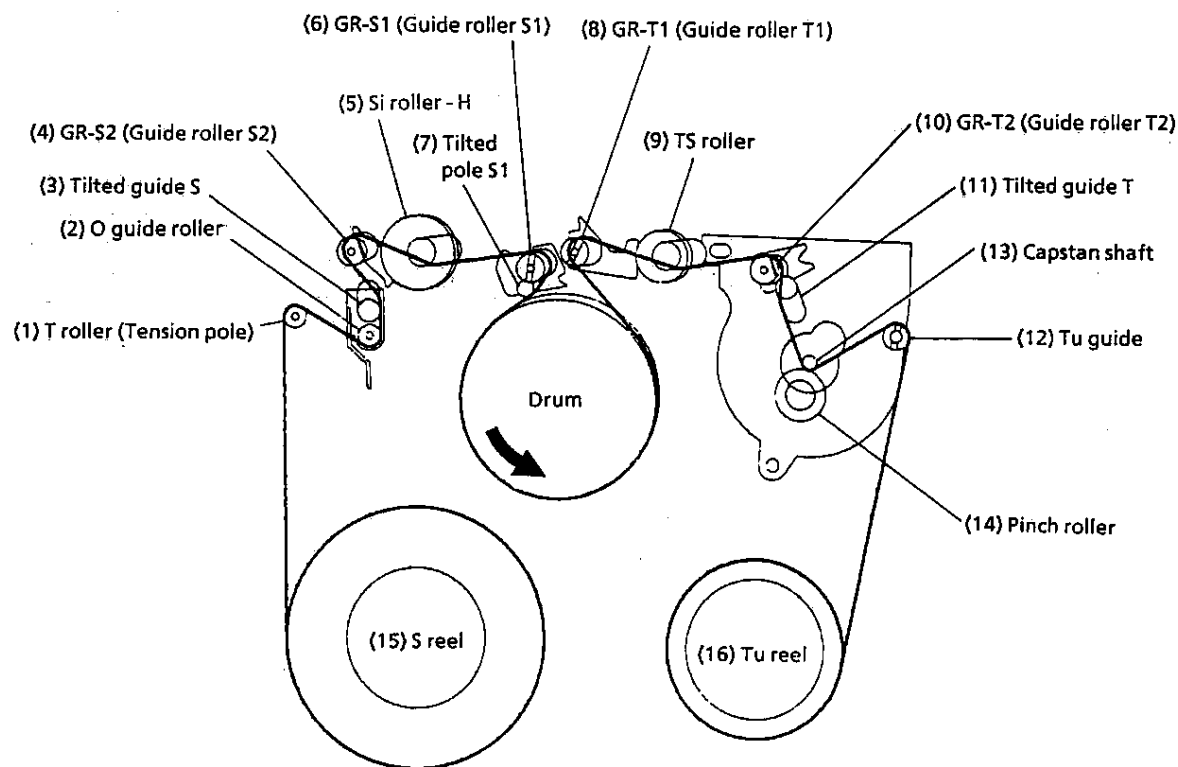


Figure 7-3-2. Tape Guide Allocation in Tape Travel System

7-3-3. CLEANING THE DRUM ASS'Y

Prepare the cleaning paper (JiGDUSPER) made wet to the desired degree with industrial-use ethyl alcohol. Gently apply that paper to the drum ass'y. Using the fingers, slowly turn the upper drum ass'y counterclockwise to clean the drum.

Notes:

1. Do not run the motor by using the electric power. Also, do not turn the drum clockwise when using fingers.
2. Moving the cleaning paper vertical with the head may damage the head. Never move it vertically.
3. Never use other than the specified cleaning paper (JiGDUSPER). Otherwise, the head may get damaged.

7-3-4. NOTES AND CAUTIONS

- 1) Any cut washers, once removed for parts replacement or for other reason, should be replaced with new ones.
- 2) The mechanism of this VCR does not involve any volume adjustment. If the specified range is not satisfied, either cleaning or replacing the parts is required. For parts replacement, see "7-5. Mechanical Ass'y/Parts Removal, Reinstallation, and Replacement".
- 3) Oils
 - a) Be sure to use the specified oils (Different viscosity may cause troubles).
 - b) For the bearings, be sure to use oil that is free from dust and other foreign matters. (Dust or other foreign matter contained in the oil may become a cause of wear or seizure of the bearings.)

- c) A drop of oil indicates the amount on a needle end as shown by the Fig. 6-3-4(a)

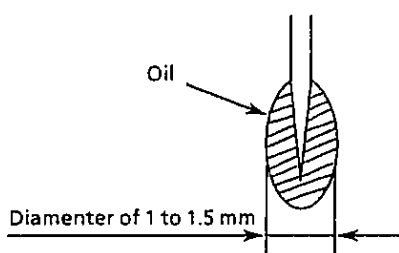


Figure 7-3-4(a).

- 4) Exercise caution not to give any deformation as a whole. Especially, a great care should be exercised when handling the cassette control ass'y. When moving or carrying the finished mechanism or chassis, do not hold the slide chassis or the cassette control ass'y because it appears the most convenient to hold.

Mechanism:

Be sure to move or carry the mechanical unit by holding the both sides of the mechanism frames F and R (Exercise caution not give them a bend).

Chassis (with the MD frame):

Be sure to hold the MD frame when carrying the chassis.

- 5) The mechanism must have the mechanism holding frame mounted when placed upright or upside down for repairing circuits.
- 6) For operating the mechanism alone, either use the motor (whose terminal-to-terminal voltage is 5 V or lower) or use the geared driver (JiGDRIVERMX7U1).
- 7) Exercise caution not to accidentally unhook the springs of the cassette control ass'y by catching on them (Four springs. See Fig. 7-3-4(b)).
- 8) For loading (For pressing down) the cassette control ass'y, be sure to press it at Area ① as shown in Fig. 7-3-4(b).

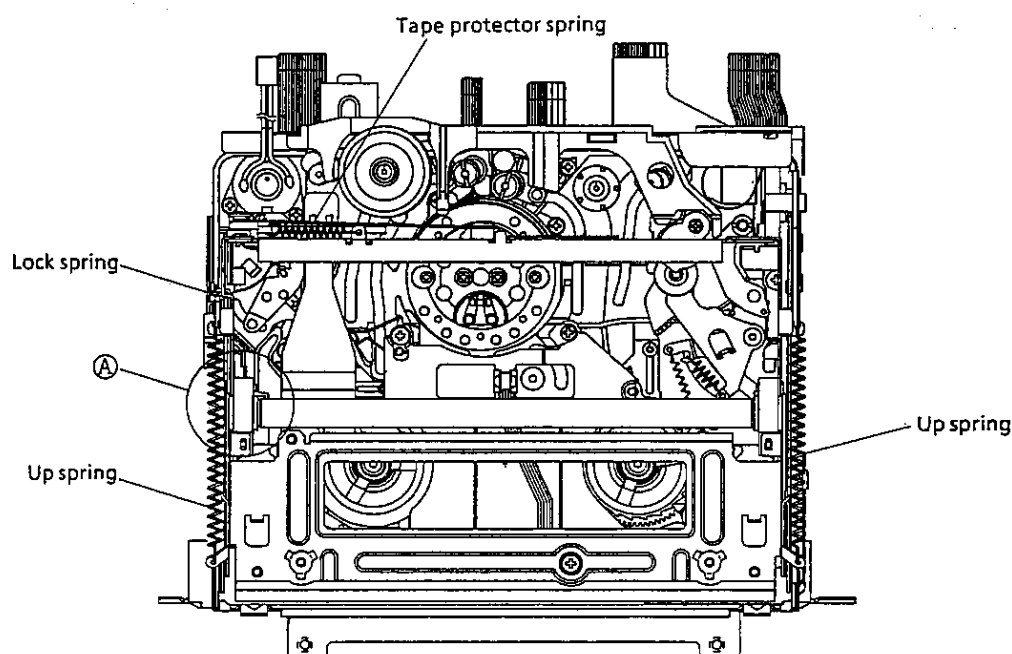


Figure 7-3-4(b).

7-4. MECHANISM CHECKS AND ADJUSTMENTS

The descriptions given here are related to the general field services, but not to related to the adjustment and replacement that require the highlevel equipment, jigs, and technical skills. In order to maintain the initial characteristics of the machine, it is an absolute must not to give any damage to the tape and other parts as well as to give the machine the inspection and maintenance described here. Also for that purpose, be sure to use the jig in the adjustments that require such jigs.

<Notes and Cautions>

- 1) Before starting mechanism checks and adjustments, install the mechanism frames R and L in the mechanism unit.
- 2) For mechanism checks and adjustments, be sure to use the AC adaptor as the power supply.
- 3) For running the tape, be sure to install the cassette control ass'y (See Section 7-5-1). (If the cassette control ass'y expects to be removed subsequently after its installation, it is convenient to have the lock washers left removed when installing the ass'y.) Do not forget to install the damper when installing the ass'y (You can leave the down guide ass'y removed).

7-4-1. CHECKING THE REEL DISK HEIGHT

- 1) Referring to Section 7-5-1, remove the cassette control ass'y.
- 2) While exercising due care not to let the master plane touch the tape contacting areas such as the drum and the guide rollers, position the master plane in such manner as that the two guides (which are shown by ① and ② in Fig. 7-4-1(b)) get in the holes of the master plane, then properly set it in the mechanism.
- 3) Using slide calipers or other appropriate instrument, check that the distance from the top of the master plane to the reel support surface of the S/Tu reel disk is within the specified range.

Note:

For the measurement, do not apply an excessive force to the reel support surface of the reel disk. Otherwise, accurate measurement cannot be expected due to inclination of the reel disk.

- 4) If the measurement is not within the specified range, replace the reel disk ass'y (See sections 7-5-4 and 7-5-5).
- 5) Check the above in the following two modes.
 - a) Standby mode
 - b) Playback/Recording mode

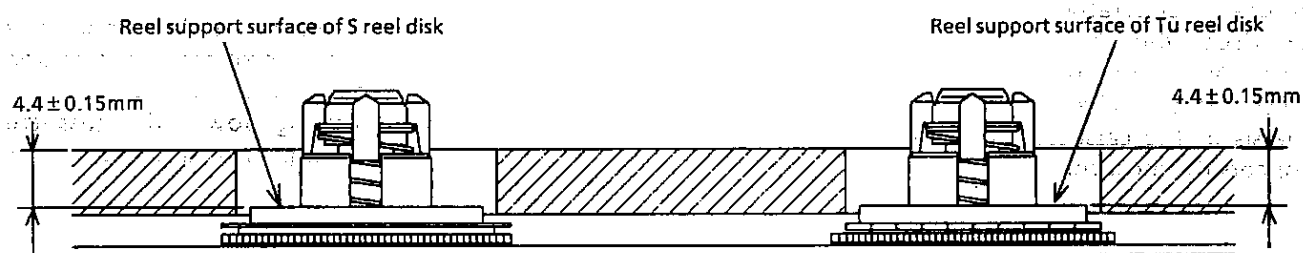


Figure 7-4-1(a).

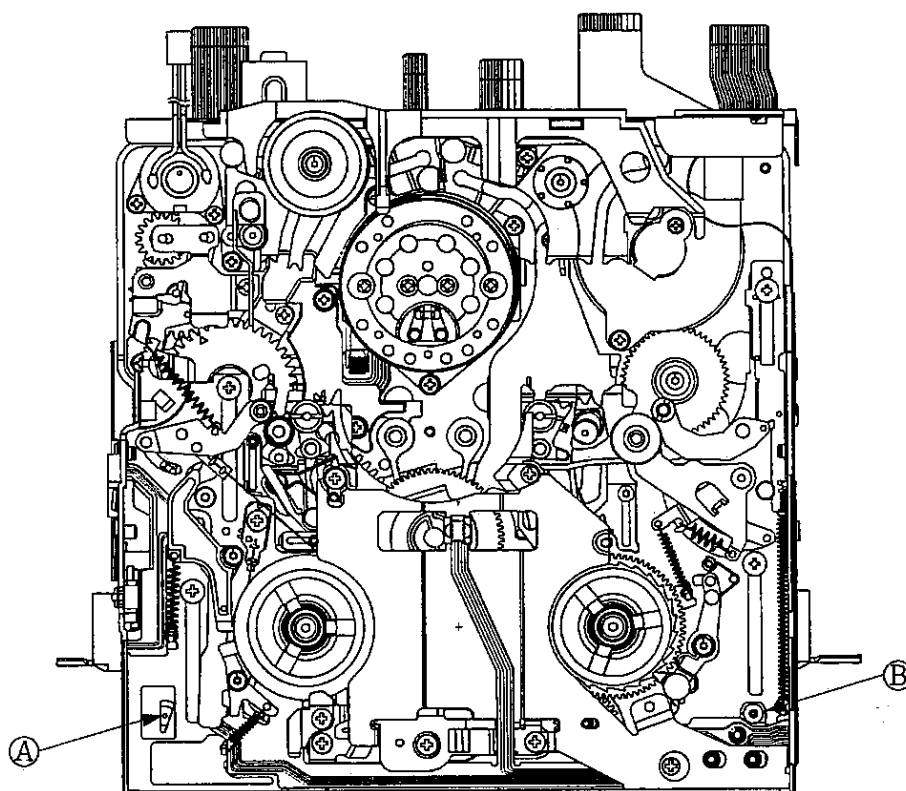


Figure 7-4-1(b).

7-4-2. CHECKING THE TAKE-UP TORQUE FOR PLAYBACK/RECORDING

- 1) Set the cassette torque meter (JIG8T-012) in position, then check in SP-mode recording mode (in playback mode for the tape on which signals have already been recorded) that the torque at the tape taking-up side is within the standard range.

Standard of Take-up torque for SP-mode recording/playback:
 11 ± 5 g·cm with ripples of below 4 g·cm. (If the torque indicated ripples, read the torque between the ripples.)

7-4-3. CHECKING AND ADJUSTING THE BACK TENSION TORQUE FOR PLAYBACK/RECORDING

• Checking

- 1) Set the cassette torque meter (JiG8T-012) in position, then check in SP-mode recording mode (or in playback mode for the tape on which signals have already been recorded) that the torque at the tape supply side is within the standard range.

Standard of back tension torque for SP-mode recording/playback:

5 ± 0.5 g·cm with ripples of below 0.5 g·cm.

• Adjustment

- 1) If the back tension torque is not within the standard range, change the T arm spring hooking position for adjustment. That is, change it to the position nearer to you when the torque exceeds the range, or to the position further from you when it is below the range.
- 2) After adjustment, apply an appropriate amount of the screw locking agent (1401B of THREE BOND) to the new spring engaging part.

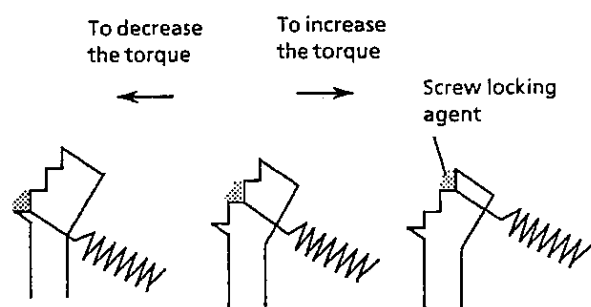


Figure 7-4-3.

Notes:

1. After back tension adjustment, be sure to check the T roller position.
2. When using the screw locking agent, take due care not to let it adhere to other parts (especially when it threads after applied).

7-4-4. CHECKING AND ADJUSTING THE T ROLLER POSITION

• Checking the Position

- 1) Check that the T roller is in the specified position at the start of taking up the P6-120 (See Fig.7-4-4(a)).
Simplified way of position check:
Check that the edge of the tension arm ② is located at the center of the T arm operating lever shaft ①, as shown by Fig. 7-4-4(b).
- 2) If not in the specified position, remove the cassette, and adjust the position in the following procedures:

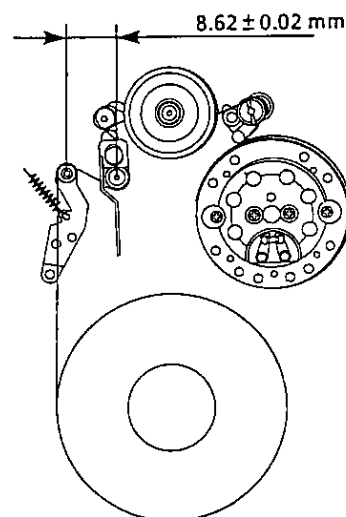


Figure 7-4-4(a).

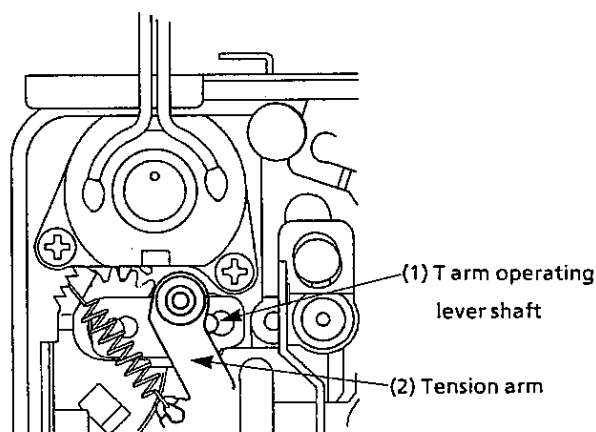


Figure 7-4-4(b).

• Adjustment

- 1) Put the machine in playback/recording mode (Leave the cassette removed).
- 2) Turn off the power (Not by turning off the power switch but by turning off the AC adaptor power).
- 3) Loosen the screw ① to such degree that the T adjusting plate ② becomes movable.
- 4) If the T roller is located inward to the specified position, move the T adjusting plate ② in the direction of arrow ④. If located outward to the specified position, move it in the direction of arrow ⑤. Then tighten the screw ①. (For the amount of moving the adjusting plate, use the location 0.1 to 0.4 mm outward to the specified position as the criterion.) For this positional adjustment, it is convenient to use the T roller position adjusting driver (JiGDRiVERMX7U2). Set it in the hole ③ when using it.
- 5) Check the T roller position in the procedure as described above.
- 6) If still out of the specified position, repeat the steps 1) to 4) above till properly adjusted.

- 7) After completing the adjustment, apply an appropriate amount of the screw lock (1401B of THREE BOND) to the screw ①.

Notes:

1. When applying the screw locking agent, take due care not to let it stick to other parts (especially when it threads).
2. Tighten the screw with the torque of 0.4 ± 0.02 kg-cm.
3. Be sure to check the position while running the tape.
4. Removing the cassette control ass'y makes the positional adjustment easier (If you do so, remove it while referring to 7-5-1. "Removal and Reinstallation of the Cassette Control Ass'y")

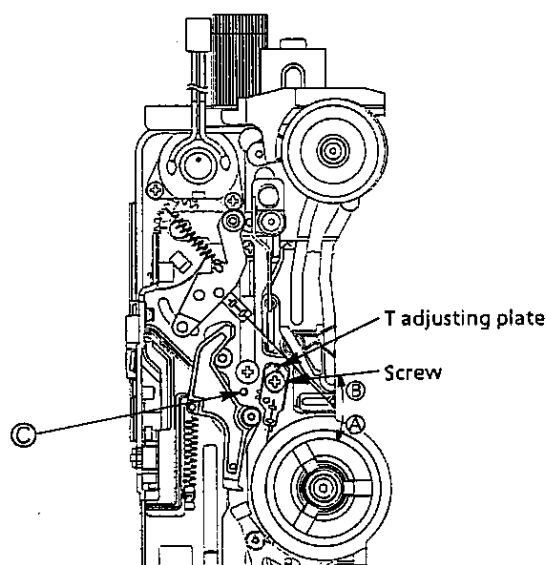


Figure 7-4-4(c).

7-4-5. CHECKING THE TAKE-UP TORQUE FOR VIDEO SEARCH REWIND (VS-REW)

- 1) Set the cassette torque meter (JiG8T-032) in position, then check in video search rewind (VS-REW) mode that the torque measured at the tape supply side is within the specified range.
Standard range (in SP-mode):
 35 ± 10 g-cm with ripples of below 8 g-cm. (If the torque indicated ripples, read the torque between the ripples.)

7-4-6. CHECKING THE BACK TENSION TORQUE FOR VIDEO SEARCH REWIND (VS-REW)

- 1) Set the cassette torque meter (JiG8T-032) in position, then check in video search rewind (VS-REW) mode that the torque at the tape take-up side is within the specified range.
Standard range (in SP-mode):
 13 ± 5 g-cm with ripples of below 4 g-cm. (If the torque indicated ripples, read the torque between the ripples.)

7-4-7. CHECKING THE LOADING BRAKE TORQUE

- 1) Referring to section 7-5-1, remove the cassette control ass'y.

- 2) Put the machine in standby mode.
- 3) Put the swing arm ass'y in such position as not to mesh with the S reel disk.
- 4) Place the torque gauge (45 g-cm) on the S reel disk, then check by slowly turning the torque gauge clockwise (Use 2 or 3 seconds for a single turn) that the torque measured is within the specified range.
Specified range:
 6.5 ± 2 g-cm. (If the torque indicated ripples, read the torque between the ripples.)

Notes:

1. Be sure to set the torque gauge securely onto the reel disk. Accurate measurement cannot be expected if it is loosely set.
2. When setting the torque gauge, do not apply other force than its own weight.

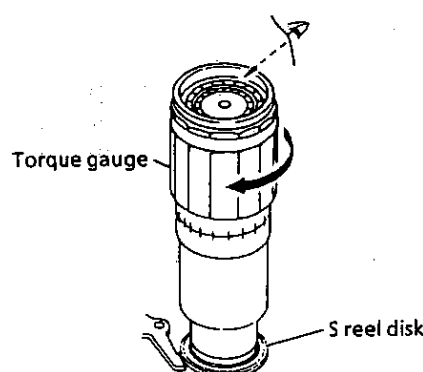


Figure 7-4-7.

7-4-8. CHECKING THE MAIN BRAKE TORQUE

- 1) Referring to section 7-5-1, remove the cassette control ass'y.
- 2) Put the mechanism in LD-STOP (Loading stop) mode.
- 3) For the subsequent procedures, see Steps 3) and 4) of Section 7-4-7. (The standard value differs from 40 ± 10 g-cm.)

7-4-9. CHECKING THE LOCK BRAKE TORQUE

- 1) Referring to section 7-5-1, remove the cassette control ass'y.
- 2) Put the mechanism in standby mode.
- 3) Release the Tu ratchet by moving it in the direction of arrow A as shown in Fig. 6-4-9(a).
- 4) Set the lock brake measuring reel onto the Tu reel disk.
- 5) Using the dial tension gauge (JiGDT-10G), check by measuring the lock brake torque as shown by Fig. 7-4-9(b) that the torque is within the specified range. For this measurement, slowly turn the reel (2 or 3 seconds for a single turn) in clockwise direction.
Specified range:
 $4 \begin{smallmatrix} +2 \\ -3 \end{smallmatrix}$ g-cm (Reading of the dial tension gauge: $4 \begin{smallmatrix} +2 \\ -3 \end{smallmatrix}$ g)

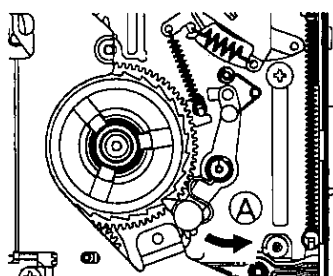


Figure 7-4-9(a)

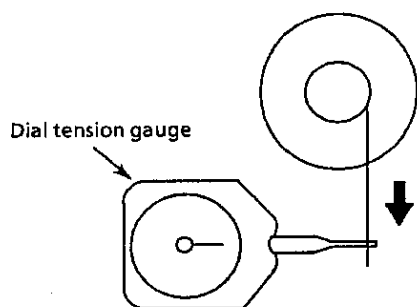


Figure 7-4-9(b).

7-4-10. CHECKING THE PINCH ROLLER PRESSURE

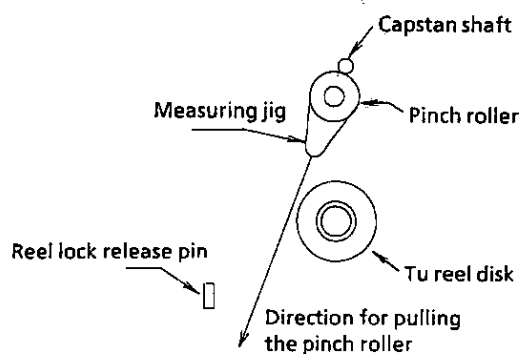


Figure 7-4-10(a).

- 1) Referring to Section 7-5-1, remove the cassette control ass'y.
- 2) Put the mechanism in LD-STOP (loading stop) mode.
- 3) Set the pinch roller pressure measuring jig (tape) onto the pinch roller ①.
- 4) Put the mechanism in playback mode, and press the pinch roller ① against the capstan shaft ②.
- 5) With the pinch roller pressed against the capstan shaft, turn off the power (not by turning off the power switch but by turning off the AC adaptor power).
- 6) Install the tension gauge (400g) to the measuring jig, and separate the pinch roller ① from the capstan shaft ② by pulling the jig in the arrow direction as shown in Fig.7-4-10(a).
- 7) Slowly returning the pinch roller ①, read the tension gauge when the pinch roller ① comes into contact parallel with the capstan shaft ② (See Fig. 7-4-10(b)).

Standard range: 270 ± 30 g·f

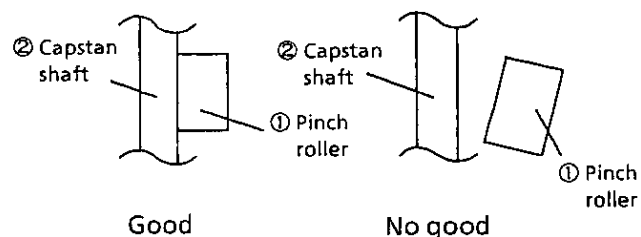


Figure 7-4-10(b).

Note:

After the measurement, cancel the playback mode without delay, and separate the pinch roller from the capstan shaft (The pinch roller will get deformed if it is left pressed against the capstan shaft for a long time duration).

7-5. MECHANICAL ASS'Y/PARTS REMOVAL, REINSTALLATION, AND REPLACEMENT

The descriptions here are related to removal, reinstallation, and replacement of the mechanical ass'y/parts for the mechanical unit.

<Cautions>

- 1) When the cut washer or washers are removed for parts replacement or for other reason, be sure to replace them with new ones.
- 2) Do not place the mechanical unit with its upside facing down on the desk or the like. If placed in such position, the mechanical parts may be deformed or damaged, possibly resulting in troubles.
- 3) While engaged in assembling work, do not put any screw, washer, or foreign matter among the parts of the mechanism. They will cause malfunctioning of the mechanism.
- 4) As the cleaning liquid, oils, grease, and screw locking agent, be sure to use the ones as specified below. Using other than those specified will result in malfunctioning of the mechanism.

| | |
|----------------------|---|
| Oils: | 1) COSMO Hydro HV22 of COSMO Petroleum |
| | 2) COSMO Hydro HV100 of COSMO Petroleum |
| Grease: | MORYCOAT X5-6020 of Dow Coating |
| Screw Locking Agent: | 1401B of Three Bond |
| Cleaning fluid: | Industrial-use ethyl alcohol |

<Manually Operating the Mechanism>

The following describe how to operate the mechanism by using a jig (i.e. a gear type driver) when the mechanism consists of the mechanical unit alone, that is, with no PWB provided. (There is another way of manually operating it:

Operate it by applying a voltage of 3 to 4 V to the loading motor. In this case, pull the connector off the PWB.)

- 1) Referring to Section 7-5-6, remove the loading motor ass'y.
- 2) Set the end of the jig (gear type driver) in the hole ① in the main chassis, then engage the gear of the jig with the loading gear.
- 3) By turning the loading gear, the mode in which the mechanism is can be changed into another mode.

<Loading gear turning direction and mechanism operation>

- Clockwise direction: Unloading.
- Counterclockwise direction: Loading.

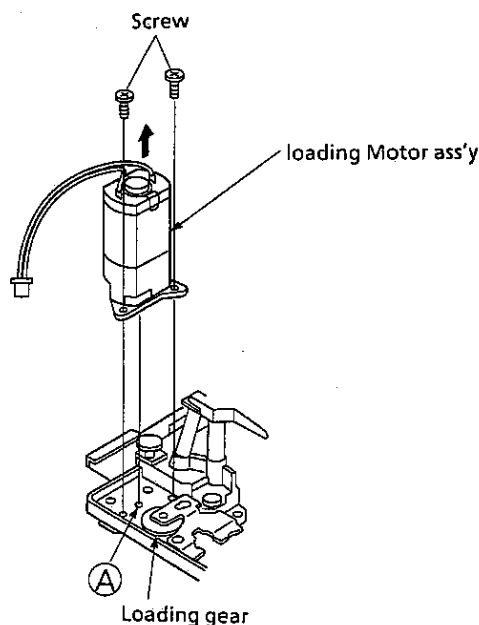


Figure 7-5(a).

<Mechanical Modes>

The following descriptions are given to outline each mechanical mode:

- 1) Eject mode (Cassette removing position) (Fig. 7-5(b))

The mechanism is in this mode when the following conditions are both met: The slide chassis is in the furthest position from the drum and the eject lever is in position ① as shown in Fig. 7-5(c).

- 2) Standby mode (Cassette inserting position) (Fig. 7-5(b))

The mechanism is in this mode when the eject lever is in position ② as shown in Fig. 7-5(c) (with the mechanism in the same state as the mode 1) described above excepting the eject lever.

- 3) Playback mode (Position for playback, recording, fast forward, rewind, etc.) (Fig. 7-5(d))

The mechanism is in this mode when the slide chassis is in the nearest position to the drum and the tape is pulled out and running.

i) The pinch roller is pressed against the capstan shaft (Fig. 7-5(e)).

ii) The main brake and the Tu ratchet are both released (Fig. 7-5(f) and (g)).

- 4) LD-STOP (loading stop) mode (Stopping position) (Fig. 7-5(d))

This mode is achieved when the conditions below are both met by further turning the loading gear counterclockwise, that is, in the loading direction, from the position 3) above.

i) The pinch roller is kept completely away from the capstan shaft (Fig. 7-5(e)).

ii) The main brake and the Tu ratchet are in contact with each other (Fig. 7-5(f) and (g)).

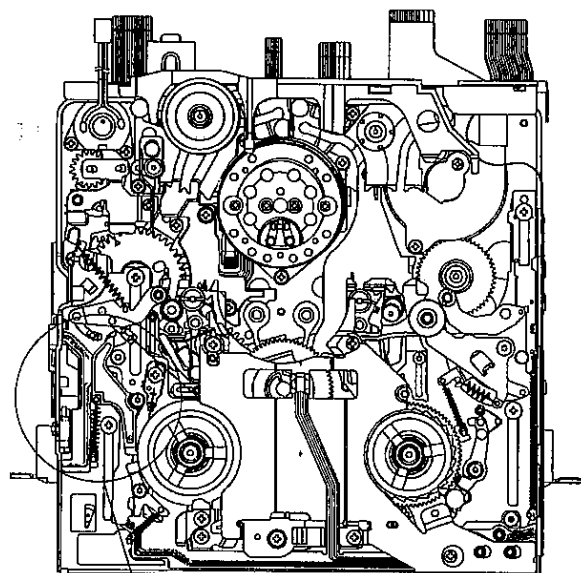


Figure 7-5(b).

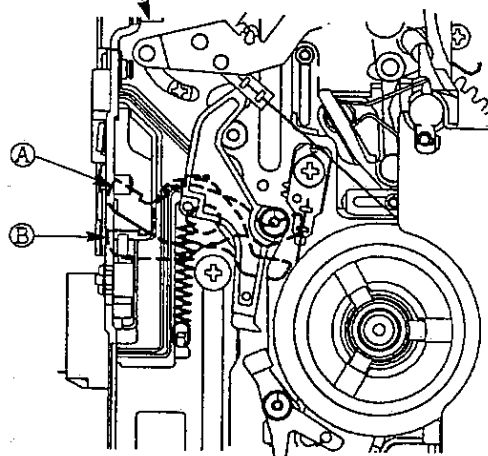


Figure 7-5(c).

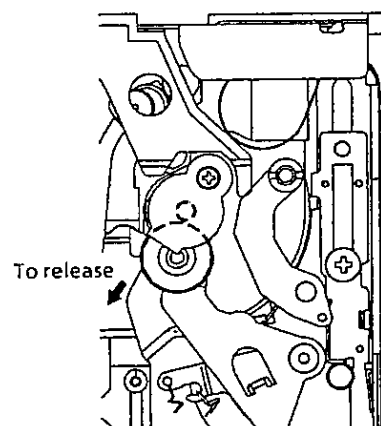


Figure 7-5(e).

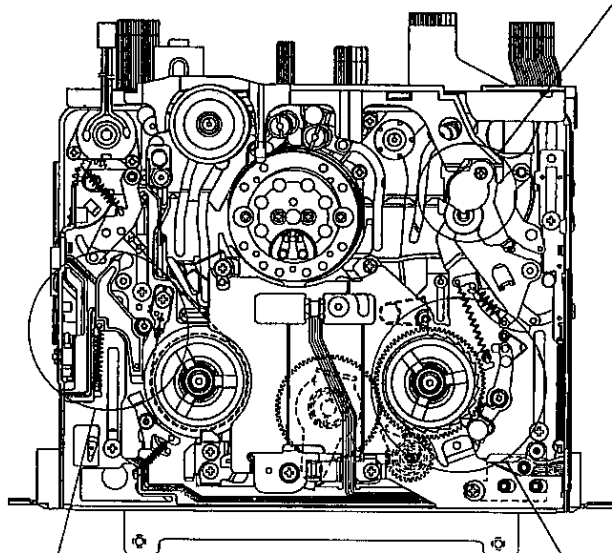


Figure 7-5(d).

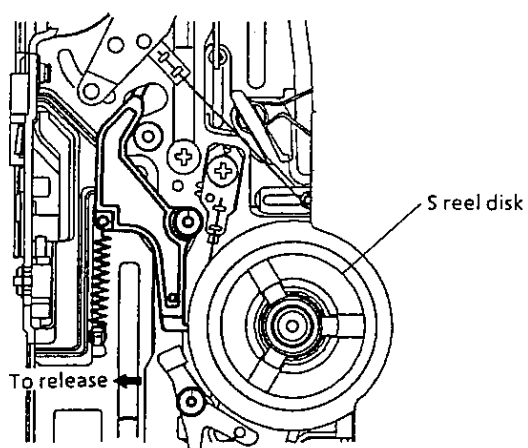


Figure 7-5(f).

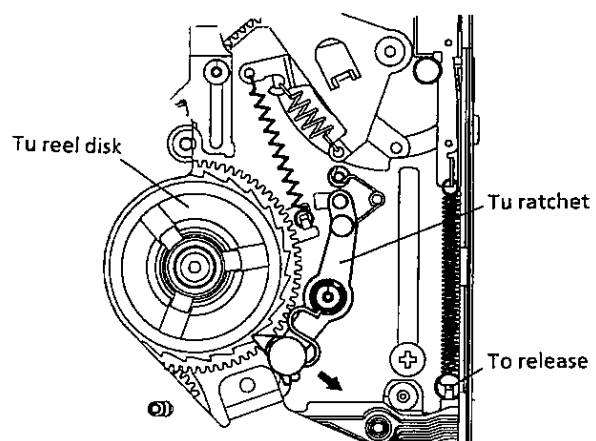


Figure 7-5(g).

7-5-1. REMOVAL AND REINSTALLATION OF CASSETTE CONTROL ASS'Y

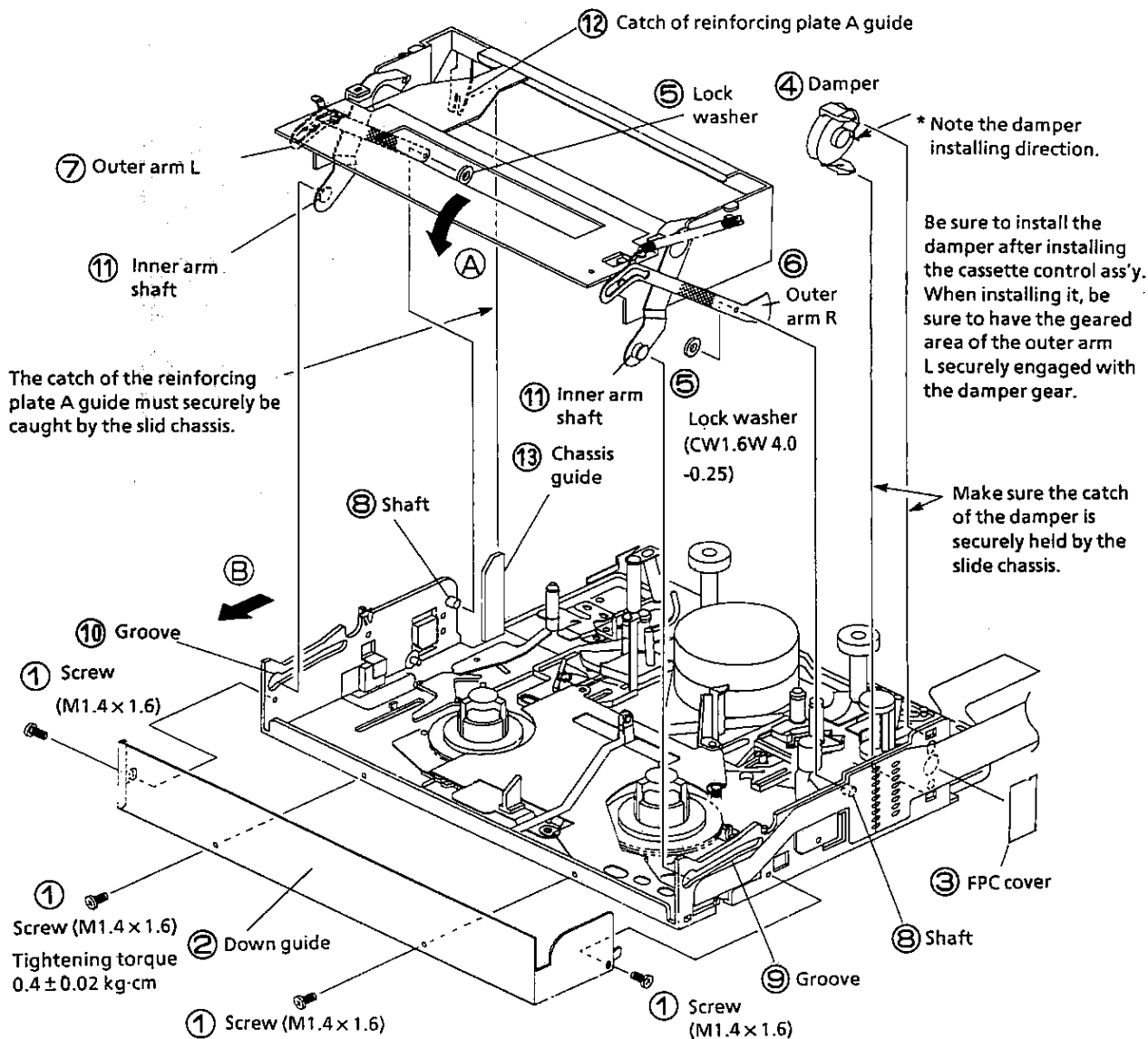


Figure 7-5-1(a).

• Removal

- 1) Set the mechanical unit in standby mode and put the cassette control ass'y in eject position.
- 2) Remove the four screws ①, and remove the down guide ②.
- 3) Strip the FPC cover ③ by using a pair of tweezers or by other appropriate means, then remove the damper ④ by pressing its catches in the arrow directions as shown by Fig 6-5-1(b).
- 4) Remove the two lock washers ⑤, then remove the outer arms R ⑥ and L ⑦ from the shaft ⑧ by pressing them inward at the shaded positions respectively (Take due care not to press them harder than necessary lest they be deformed).
- 5) Turn the cassette control in the direction of arrow A then slide it in the direction of arrow B.
- 6) Remove the inner arm shaft ⑪ from the slide chassis grooves ⑨ and ⑩ by sliding it in the direction of arrow C as shown by Fig. 7-5-1(c). (Exercise due care not to deform the arm excessively.)

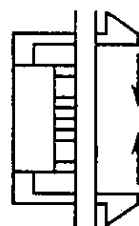


Figure 7-5-1(b).

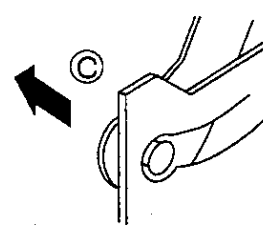


Figure 7-5-1(c).

• Reinstallation

- 1) Set the mechanism in standby mode.
- 2) Install the inner arm shaft ⑪ into the slide chassis grooves ⑨ and ⑩. (Exercise due care not to deform the arm more than necessary.)
- 3) Slide the cassette control ass'y in the direction reverse to arrow B.
- 4) Turn the cassette control ass'y in the direction reverse to arrow A, and install the outer arms R ⑥ and L ⑦ on the shaft ⑧.

Note:

Be sure to check that the reinforcing plate A and the catch ⑫ of the reinforcing plate guide A are securely hooked on the chassis guide ⑬.

- 5) Install the lock washer ⑤ (CW 1.6W4.0-0.25) on the shaft ⑧.

Note:

Do not reuse the lock washer.

- 6) Install the damper ④.

Notes:

1. Note the damper installing direction (See Fig. 7-5-1(d)), and check that the claws ① and ② of the damper are securely caught by the chassis.
2. When installing the damper, make sure that the geared area of the outer arm R ⑥ is securely engaged with the damper gear. (Make it sure by checking that damper is working when the cassette control ass'y is pressed down).
- 7) After placing the FPC cover ③ using a pair of tweezers or the like (See Fig. 7-5-1(d)), closely attach it entirely by pressing on it. While pressing the cover, take care not to deform the slide chassis by giving a pressing force in the reverse direction such as pressing the damper.

Notes:

1. After attaching the FPC cover, make sure it is closely sticking all over.
2. Be sure to attach the FPC cover, as shown in Fig. 7-5-1(d), in such position that the FPC cover is located just between the claws of the damper and also that it does not jut out of the edge of the chassis.

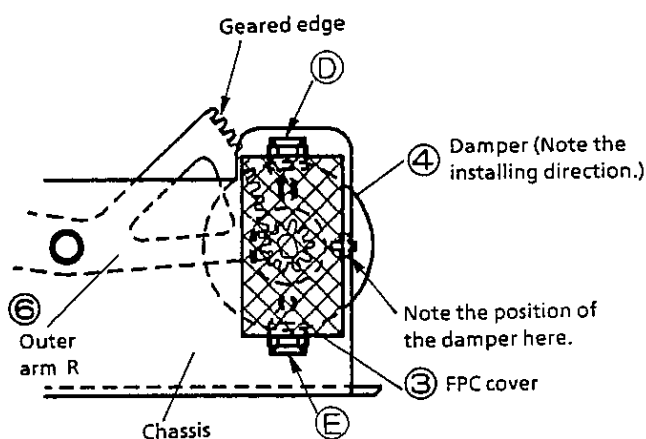


Figure 7-5-1(d).

3. Make sure that the damper does not get out of position.
4. Be sure to use a new FPC cover.
- 8) Install the down guide ② on the chassis, and secure it by the four screws ①.

Notes:

1. When the cassette control ass'y is up, the end of the tape protector should be located at such position as shown by Fig. 7-5-1(e).

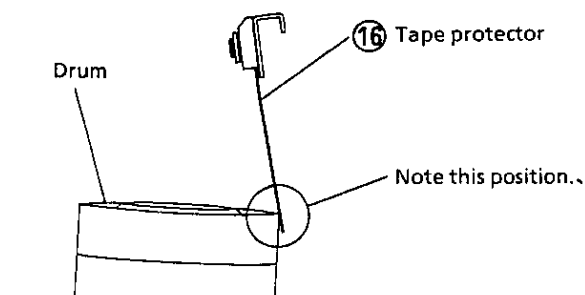
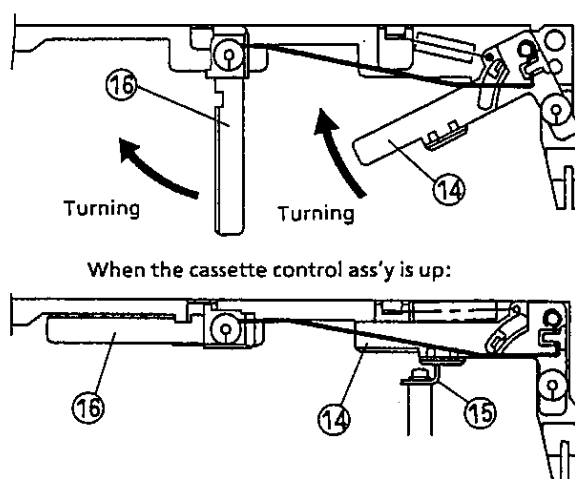


Figure 7-5-1(e).

2. After completing the cassette control ass'y installation, make sure these points: The cassette control can be smoothly mounted, the protector arm ⑭ gets in contact with the TP guide ⑮, and the protector arm ⑭ and protector ⑬ turn (See Fig. 7-5-1(f)).



When the cassette control ass'y is down:

Figure 7-5-1(f).

● How to eject the cassette control ass'y

Eject the cassette control ass'y by turning the spring holding portion of the lock lever in the arrow ⑦ direction.

Note:

Exercise care not to deform the spring hooked on the lock lever.

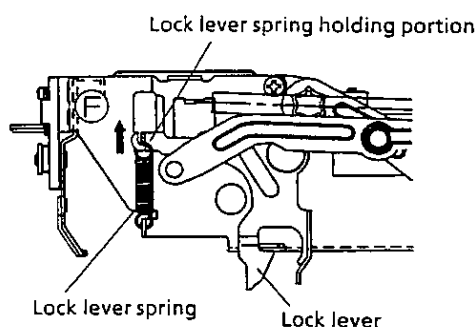


Figure 7-5-1(g).

7-5-2. REMOVAL AND REINSTALLATION OF LED
HOLDING ANGLE

● Removal

- 1) Referring to Section 7-5-1, remove the cassette control ass'y.
- 2) Turning the LED ① in the direction of arrow A, as shown by Fig. 7-5-2(a), remove the LED ① in the arrow B direction.
- 3) Remove the screws ② thru ④.
- 4) Remove the PB protector ⑥.
- 5) After sliding the LED holding angle ⑦ in the direction of arrow C, as shown in Fig. 7-5-2(d), remove it by pulling it up.

Note:

Exercise due care when working with the LED holding section because it is apt to deform.

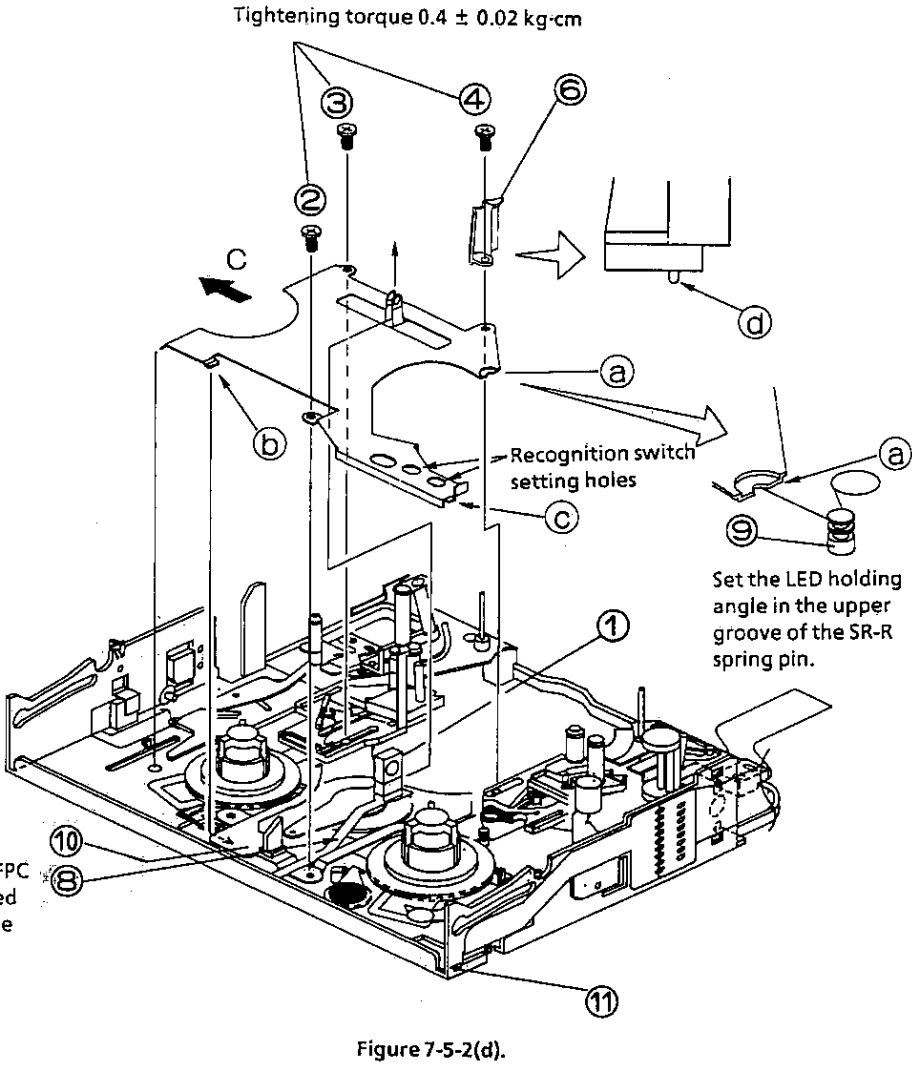
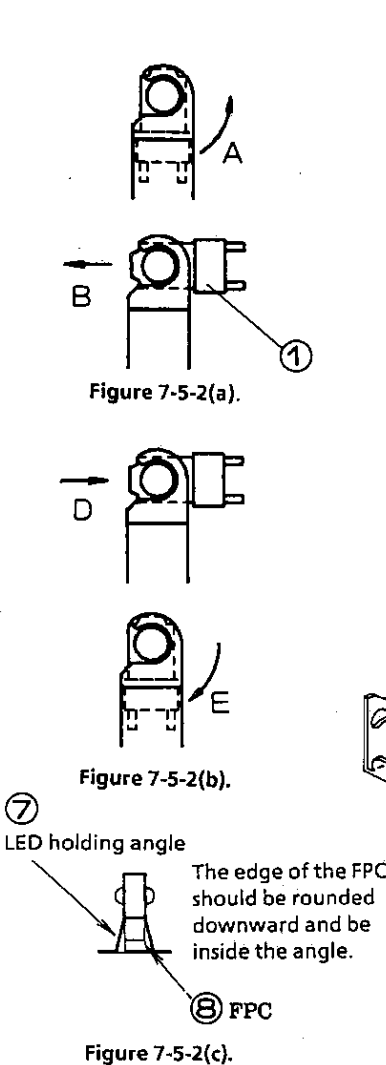
● Reinstallation

- 1) Put the mechanism in standby (eject) mode.
- 2) Hold up the LED ①, then insert the LED holding angle ⑦ beneath the FPC ⑧.

- 3) Slide the LED holding angle ⑦ so that its edges ①, ②, and ③ respectively come into the upper groove of the SR-R spring ④, beneath the reel lock release angle ⑤, and in the square hole made in the side of the slide chassis ⑥ (See Fig. 7-5-2(d)).
- 4) Install the screws ② and ③ in that order.
- 5) Put the positioning pin ④ of the PB protector ⑤, then fix it by tightening the screw ④.
- 6) As shown by Fig. 7-5-2(b), install the LED by putting it in the arrow-D direction and then turning it in the arrow-E direction.
The edge of the FPC should be rounded downward and be inside the angle as shown in Fig. 7-5-2(c).
- 7) Referring to Section 7-5-1, install the cassette control ass'y.

Notes:

1. After installing the LED holding angle ⑦, make sure that the LED ① stands vertical.
2. Since the number of screw types handled here is 3, do not take a wrong one when installing.



7-5-3. REMOVAL AND REINSTALLATION OF REEL LOCK RELEASE ANGLE

• Removal

- 1) Referring to Section 7-5-1, remove the cassette control ass'y.
- 2) Referring to Section 7-5-2, remove the LED holding angle.
- 3) Remove the screw ①.
- 4) While holding the LED upward, remove the reel lock release angle ②.

• Reinstallation

- 1) Put the mechanism in standby mode.
- 2) While exercising care not to hold the FPC between, install the reel lock release angle ② by aligning the positioning hole of the angle ② with the protruding part ④ of the slide chassis.
- 3) After making sure the claws ③ of the angle ② are in the round holes of the chassis, install and tighten the screw ①.
- 4) By referring to Section 7-5-2, install the LED holding angle.
- 5) By referring to Section 7-5-1, install the cassette control ass'y.

Note:

When installing the reel lock release angle ②, exercise utmost care so as not to hit it against the following parts:

- 1) S reel disk ass'y
- 2) Tu reel disk ass'y
- 3) Swing gear
- 4) Tension wire

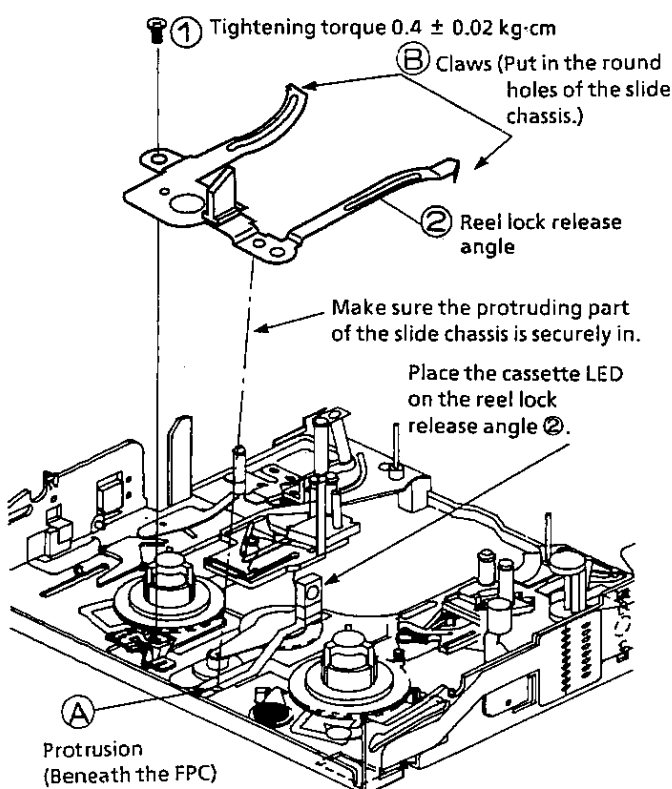


Figure 7-5-3.

7-5-4. REMOVAL AND REINSTALLATION OF S REEL DISK ASS'Y

• Removal

- 1) By referring to Section 7-5-1, remove the cassette control ass'y.
- 2) By referring to Section 7-5-2, remove the LED holding angle.
- 3) Remove screw ⑧ and reel stopper ⑦.
- 4) Remove the screw ①, then remove the tension adjusting plate ②.
- 5) Separate the main brake ③ from the S reel disk ass'y ④ by turning it in the direction ⑤. Put the tension wire ⑥ through the so made gap, then remove the S reel disk ass'y.

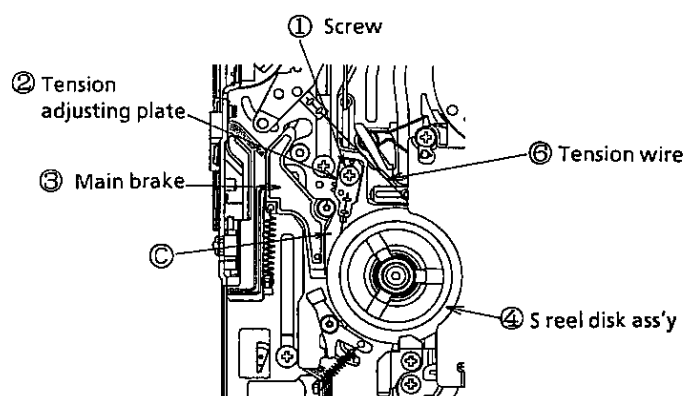


Figure 7-5-4(a).

Notes:

1. When removing and reinstalling the S reel disk ass'y, do not hold other than its knob.
2. Do not handle the tension wire with bare hand. Also, exercise caution not to let grease or other foreign matter stick to the wire.
3. Due care should be exercised so as not to give the tension wire a deformation or other damage.

• Reinstallation

- 1) Put the mechanism in standby mode.
- 2) Put the S reel disk ass'y ④ in the position with the shaft ⑤ inserted in the ass'y (till the S reel disk contacts the main brake and stops).

Note:

If the shaft does not easily go into the reel disk ass'y, give the ass'y a proper amount of force.

- 3) Move the main brake ③ in the direction ⑤, then press down the S reel disk ass'y ④ till it covers the root of the shaft. Make sure that, with the S reel disk ass'y ④ kept in that position, it turns without a hitch.

- 4) Install the tension adjusting plate ②, and secure it by the screw ① (with the tightening torque of 0.4 ± 0.02 kg-cm).

Note:

Set the tension adjusting plate at its center position.

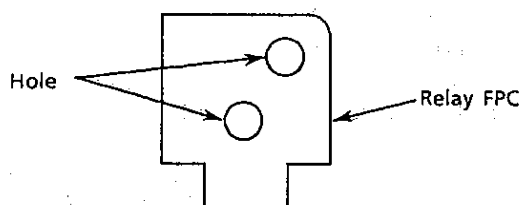


Figure 7-5-7(b).

- 8) After completing the installation, make sure that there is no trouble (such as a hitch of the pole base or other) in loading and unloading operations.
- 9) Also, make sure that there is no trouble found in tape travel (See section 7-7 "Tape Travel Adjustment").

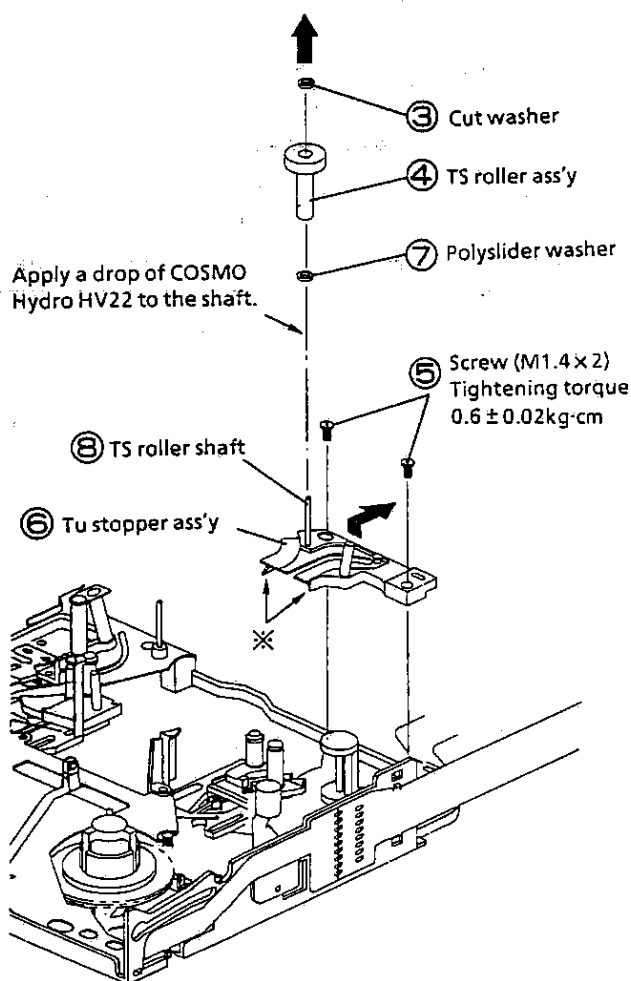


Figure 7-5-7(c).

Figure 7-5-7(d). Not used.

Apply grease to shadowed areas (section and sliding surface) of Tu stopper ass'y.

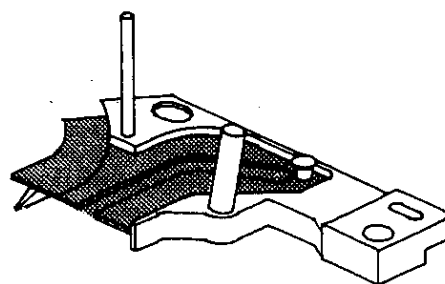


Figure 7-5-7(e).

7-5-8. REMOVAL AND REINSTALLATION OF CAPSTAN MOTOR ASS'Y

● Removal

- 1) Put the mechanism in standby mode.
- 2) By referring to Section 7-5-7, remove the Tu stopper ass'y.
- 3) Remove the screw ①. Then, disengaging the gear from the gear of the relay gear ass'y ③, remove the capstan motor ass'y ② in the direction reverse to the arrow A direction (while keeping it in tilted position).

● Reinstallation

- 1) Put the mechanism in standby mode.
- 2) As shown by Fig. 7-5-8(b), holding the capstan motor ass'y ② tilted, move it in the arrow- A direction and engage the gear of the capstan motor ass'y ② with that of the relay gear ass'y ③. Then install it while turning it in the arrow- B direction, and secure it by the screw ① with the torque of 0.7 ± 0.02 kg·cm. In this installation, insert the three capstan spacer ④ and due care should be exercised not to hurt the gears.
- 3) Make sure that the gear of the capstan motor ass'y ② is properly engaging with that of the relay gear ass'y ③ (See Fig. 7-5-8(c)).
- 4) Referring to Section 7-5-7, install the Tu stopper ass'y.

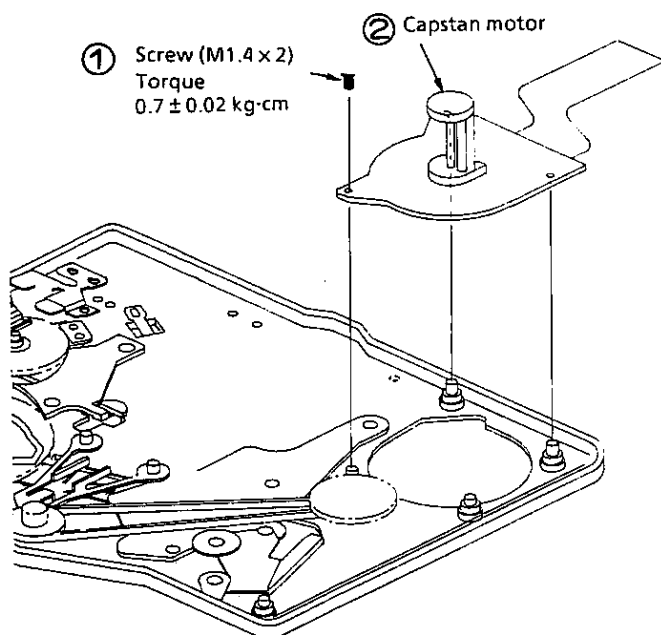


Figure 7-5-8(a).

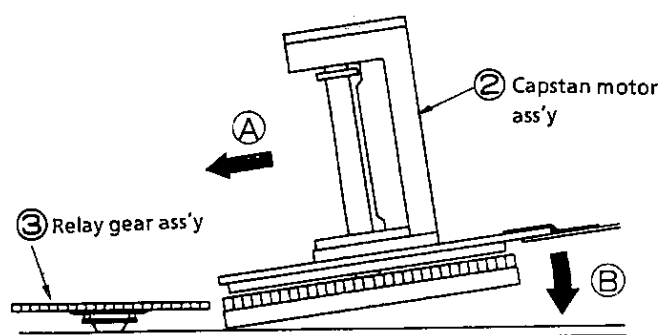
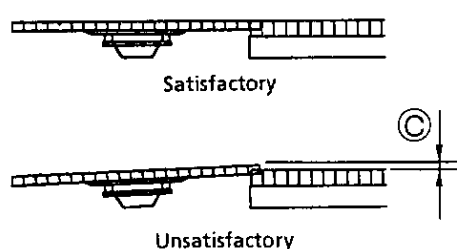


Figure 7-5-8(b).



Dimension ©: Less than 0.1 mm after giving it a turn.

Figure 7-5-8(c).

7-5-9. REMOVAL AND REINSTALLATION OF PINCH ROLLER LEVER ASS'Y

Before starting to work, remove the PWB to leave the mechanical unit alone if the machine is in VCR state.

● Removal

- 1) Referring to Section 7-5-1, remove the cassette control ass'y.
- 2) Put the mechanism in LD-STOP mode.

- 3) Turn the mechanism unit upside down, then remove the cut washer ② (While removing the cut washer, lightly hold the pinch roller lever ass'y ① so as not to let it fall down).

Note:

Do not put the mechanical unit upside down on the desk or the like. Some of the mechanical parts may be deformed and a trouble may result.

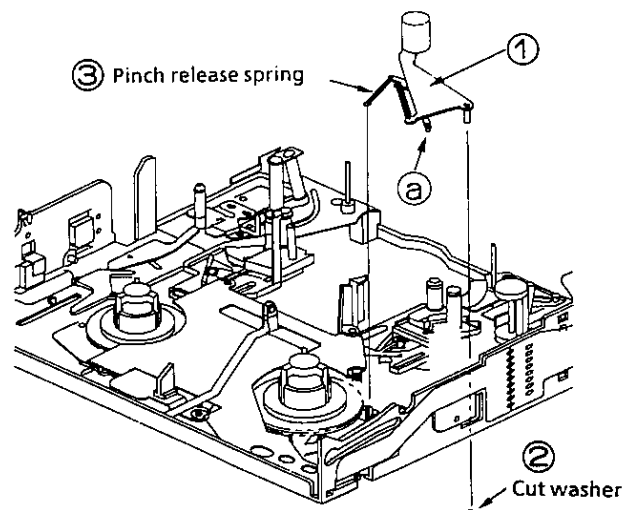


Figure 7-5-9(a).

- 4) Remove the pinch roller lever ass'y ①, then remove the pinch release spring ③ from the slide chassis.

Note:

If you remove the pinch release spring first, take utmost care so that the gear of the Tu reel disk ass'y be never hurt.

● Reinstallation

- 1) Put the mechanism in LD-STOP mode.
- 2) Install the pinch roller lever ass'y ①. This installation is made easier if the pinch release spring ③ is installed to the slide chassis first.

Note:

If installing the pinch release spring after the pinch roller lever ass'y, exercise utmost care so that the gear of the Tu reel disk ass'y be never hurt.

- 3) Insert the operating pin ③ of the pinch roller lever ass'y ① in the position as shown in Fig. 7-5-9(b).

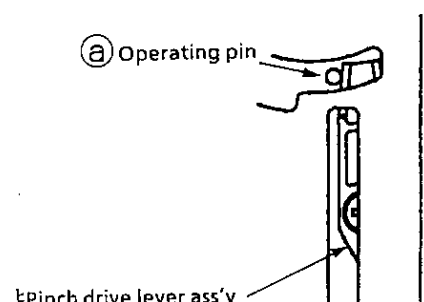


Figure 7-5-9(b).

- 4) Secure it by the cut washer ② on the rear side of the mechanical unit (Be sure to use a new cut washer).

Note:

Do not hurt or smear the pinch roller.

● Preparatory Assembling

By referring to Fig. 7-5-9(c), assemble the following parts:

- ① Pinch roller lever ass'y
- ③ Pinch release spring
- ④ Pinch double acting lever ass'y
- ⑤ Pinch pressure spring

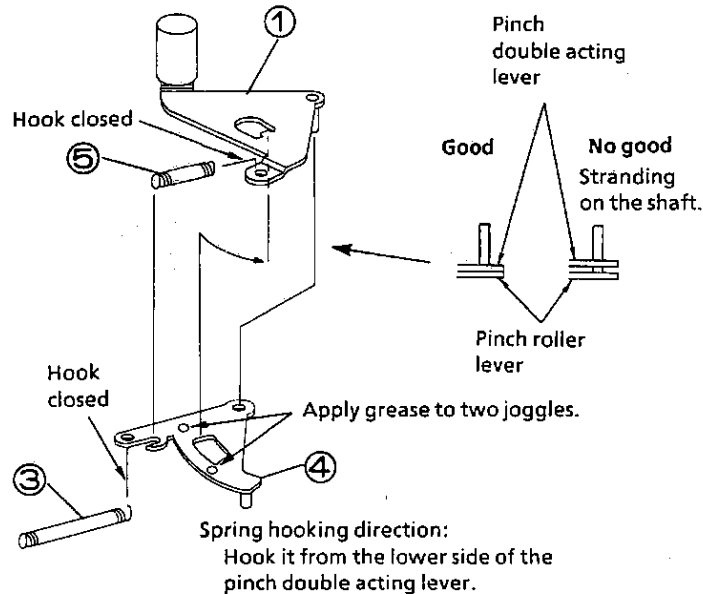


Figure 7-5-9(c).

7-5-10. REPLACEMENT OF DRUM ASS'Y

Note:

It is a must to exercise the greatest possible care when replacing the drum ass'y: Never give it even a trifle scar or other damage, and never stain the drum surface and head.

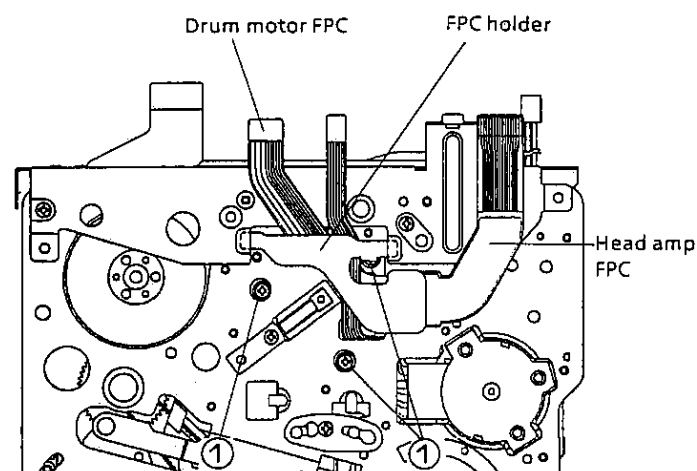


Figure 7-5-10(b).

- 1) Put the cassette control ass'y in eject state.
- 2) Remove the FPC holder.
- 3) Remove the three drum ass'y fixing screws ①, then remove the upper and lower drum ass'y. Be cautious not to hurt the drum. (See Fig. 7-5-10(b))
- 4) Install the new upper and lower drum ass'y with care taken not to give any scars, then secure them by the three drum ass'y fixing screws ①. In this installation, set the head amp FPC in hole A and the drum motor FPC in hole B (See Fig. 7-5-10(c)). The screw tightening torque is 500 ± 50 g-cm.
- 5) Install the FPC holder.
- 6) After the upper and lower drum ass'y, be sure to carry out tape travel adjustment and playback switching point adjustment.

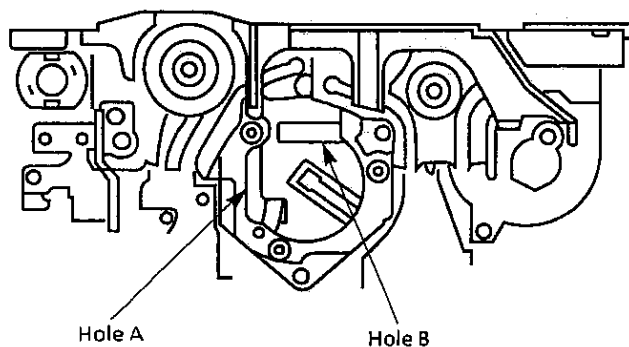


Figure 7-5-10(c).

Caution:

Below is described the mechanism assembly and parts replacement which need high technique. Therefore the mechanical service described below must be performed by the person who has taken technical training course.

If any other person must perform the mechanical service, he must read carefully the manual so as to familiarize with it and perform the service with utmost care.

7-5-11. REMOVING AND MOUNTING OF SLIDE CHASSIS

● Removal

- 1) Set the standby mode.
- 2) Referring to item 7-5-1, remove the cassette compartment ass'y.
- 3) Referring to item 7-5-2, remove the LED holding angle.
- 4) Referring to item 7-5-3, remove the real lock releasing angle.
- 5) Remove the washer (1), and remove the swing arm ass'y (2).
- 6) Remove the screw (3) (2 pcs.), and remove the SL guide angle (4).
- 7) Referring to item 7-5-7, remove the relay FPC retainer and relay FPC holder.

- 8) Load the slide chassis until the slide rail contacts the stopper (see Figure 7-5-11 (b)).
(So as to prevent deviation of pole base from the slide rail when the slide chassis is removed.)

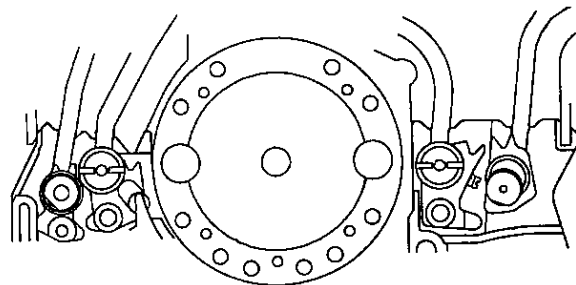


Figure 7-5-11 (a)

- 9) Remove the screws (5) (4 pcs.).
- 10) Remove the slide chassis in the arrow (A) direction. (Lift first the front side.)

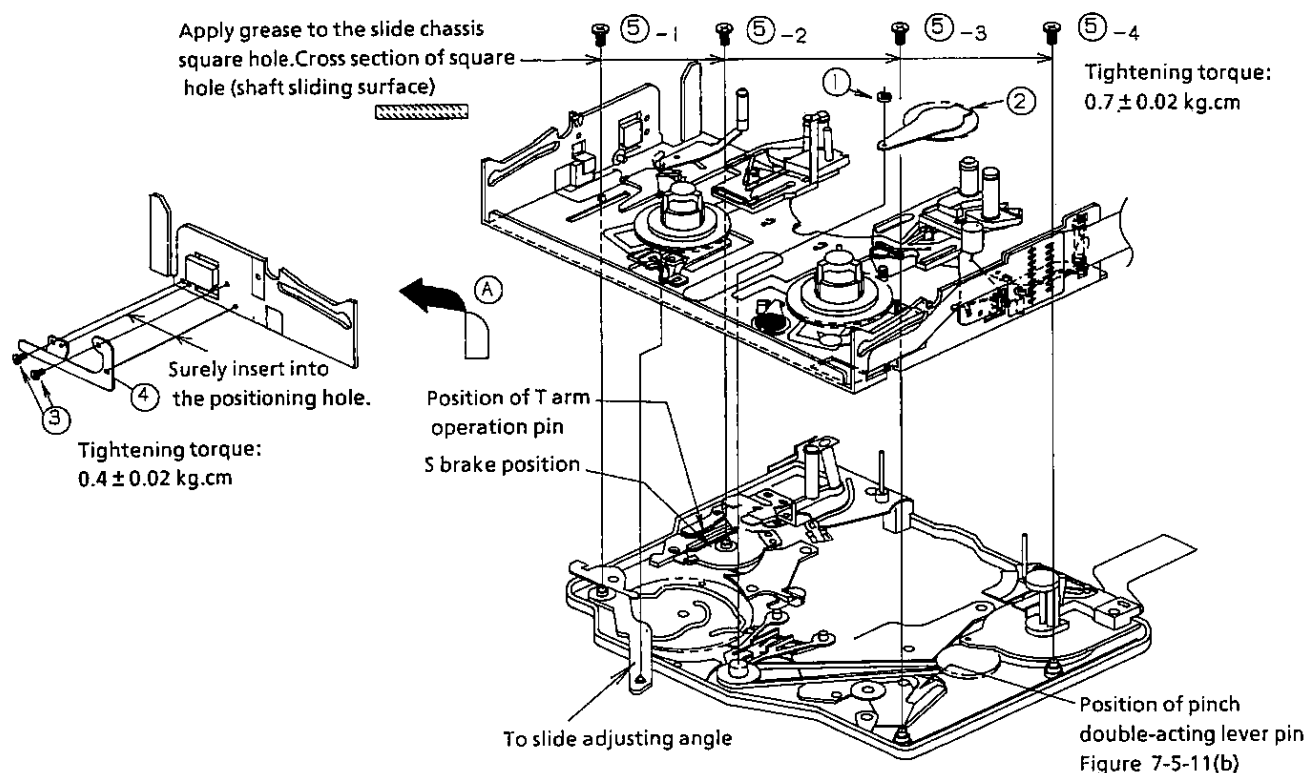


図2-5-11(b)

● Mounting

- 1) Apply a proper amount of grease to the end face of arrow-marked long hole (5)-a(hatched area) of slide chassis (5) as shown in Figure 7-5-11(c).
- 2) Referring to item 7-5-6, remove the loading motor ass'y.

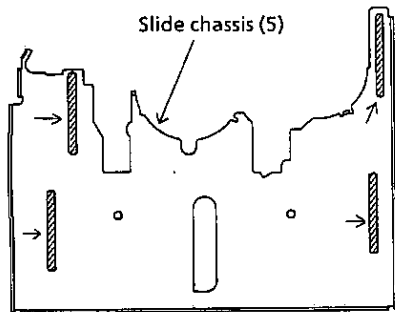


Figure 7-5-11(c)

- 3) Set the operation pin (6)-a of SL chassis drive lever (6) on the external periphery of main chassis (7) as shown in Figure 7-5-11(d).

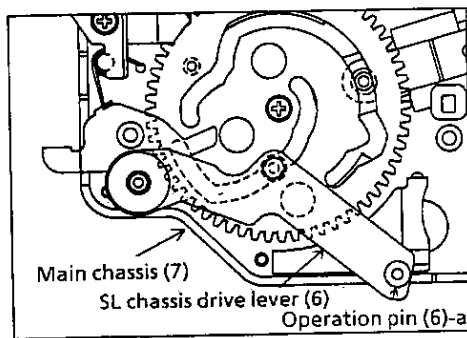


Figure 7-5-11(d)

- 4) Slightly lift the front part of slide chassis (so as to prevent contact with the operation pin of SL chassis drive lever), engage the front ends of slide rails L(8) and R(9) with the front ends of S stopper (10) and Tu stopper (11) as shown in Figure 7-5-11(e), insert the operation pin (6)-a of SL chassis drive lever (6) into the long hole (12)-a of slide adjusting angle (12) (see Figure 7-5-11(f)), and align the long hole (5)-a of slide chassis (5) (4 places) with the shaft of main chassis. (See Figure 7-5-11(b).)

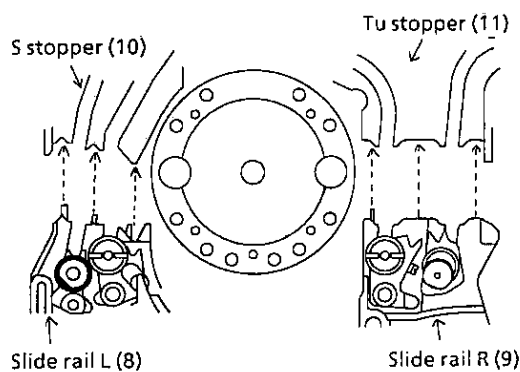


Figure 7-5-11(e)

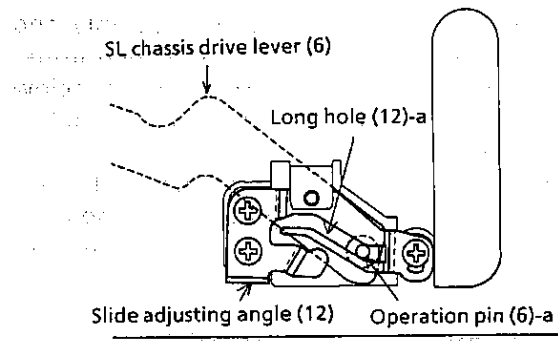


Figure 7-5-11(f)

- 5) Fit the 4 screws (tightening torque: 0.7 ± 0.02 kg.m).

Mount in the following procedure.

- ① Move the tension arm ass'y (13) in the arrow (A) direction, and insert the pin (13)-a into the groove of T arm rail (14). (See Figure 7-5-11(g).)
- ② Move the main brake (15) in the arrow (B) direction, and insert the pin (15)-a at the right side of T arm rail (14). (See Figure 7-5-11(g).)

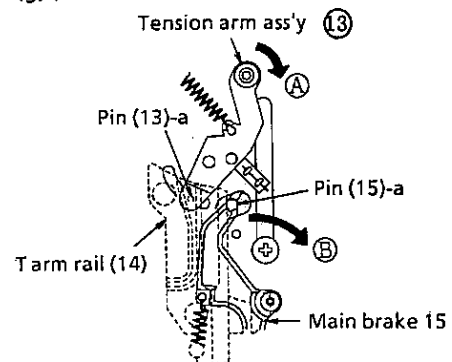


Figure 7-5-11(g)

- ③ Fit the screws (5)-1 and 2.
Care must be taken since the screw (5)-1 differs from other three screws (yellow)
Note:
Be careful so as not to deform the tension wire ass'y.
- ④ Move the pinch arm (16) in the arrow (C) direction, and insert the pin (16)-a at the left end of pinch drive lever (17). (See Figure 7-5-11(h).)

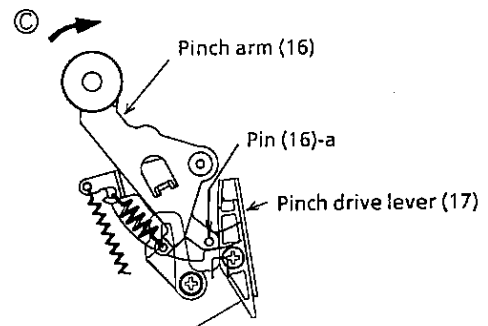


Figure 7-5-11(h)

- ⑤ Fit the screws (5)-3 and 4. When fitting the screw (5)-4, take care so that the Tu holding guide operating plate is not clamped by the shaft of main chassis.
- ⑥ Ascertain that the S loading arm (18) and T loading arm (19) are engaged with the pin (20)-a of pressure lever (20), and using the gear driver, ascertain that the loading and unloading operations are normal.

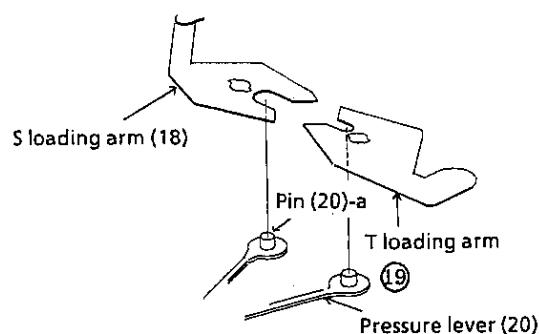
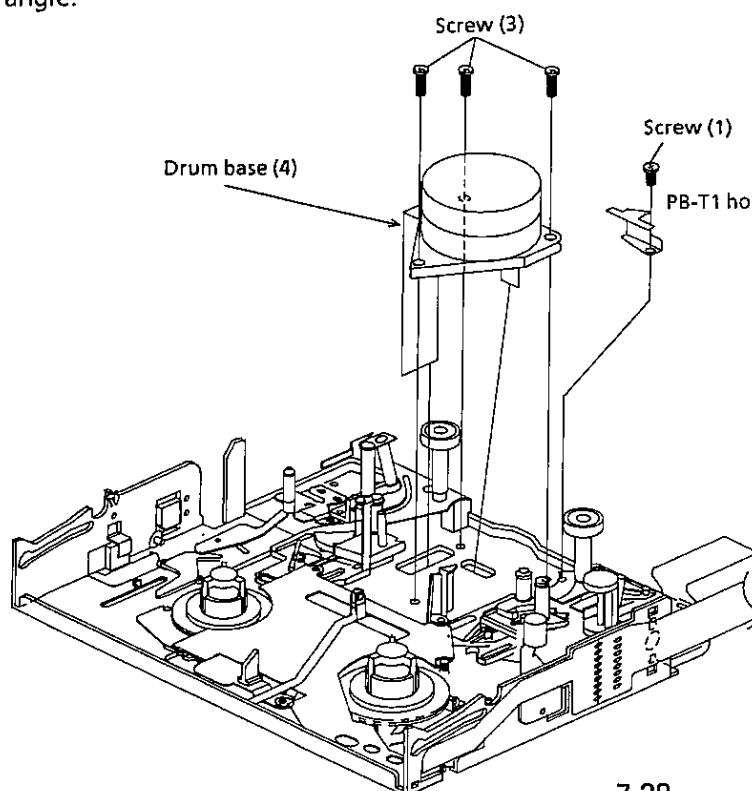


Figure 7-5-11(i)

- 6) Referring to item 7-5-7, mount the relay FPC retainer and relay FPC holder.
- 7) Mount the SL guide angle (4) with two screws (3).
- 8) Fix the swing arm ass'y (2) with the washer (1).
- 9) Referring to item 7-5-6, mount the loading motor ass'y.
- 10) Referring to item 7-5-3, mount the reel lock releasing angle.
- 11) Referring to item 7-5-2, mount the LED holding angle.



- 12) Referring to item 7-5-1, mount the cassette compartment ass'y.
- 13) Referring to item 7-7, check the tape travel.

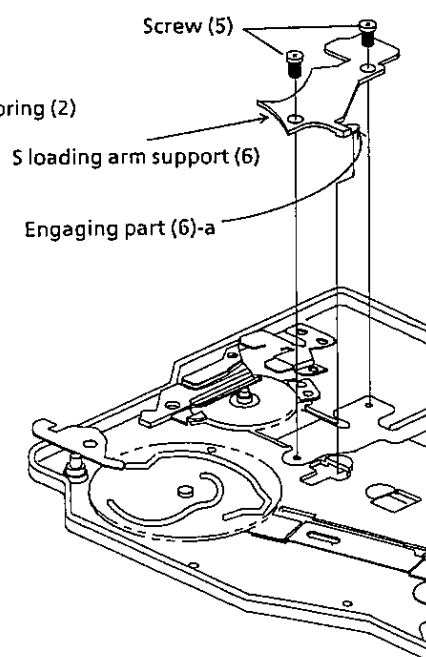
Note:

Be careful so as not to damage the drum ass'y.

7-5-12. REMOVING AND MOUNTING OF DEW SENSOR ASS'Y

• Removal

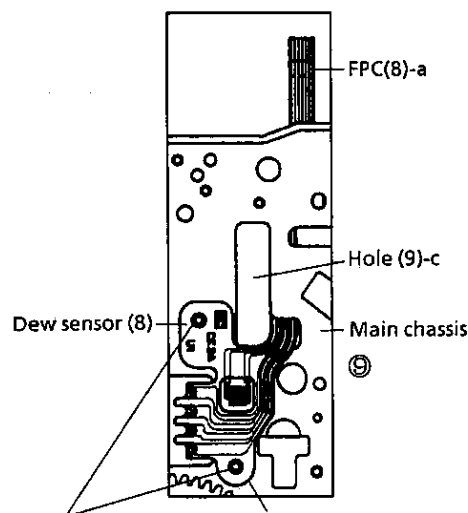
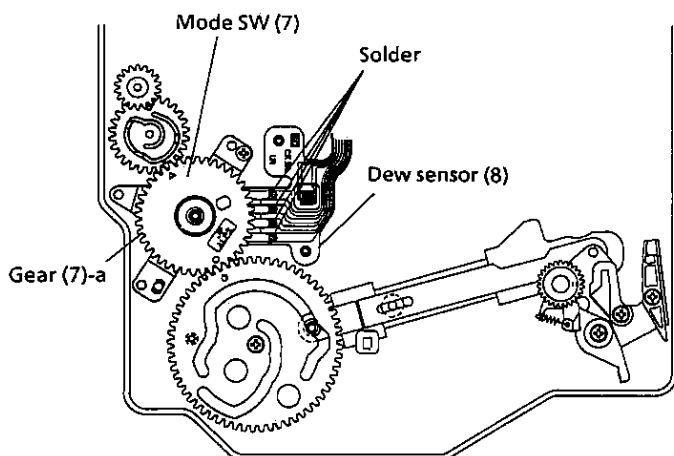
- 1) Referring to item 7-5-10, remove the FPC holder and head amp FPC.
- 2) Remove the screw (1), and remove the PB-T1 holder spring (2).
- 3) Remove the 3 screws (3), and remove the drum base (4).
(Take utmost care so as to prevent damage and contamination.)
- 4) Referring to item 7-5-11, remove the slide chassis.
- 5) Remove the 2 screws (5), and remove the S loading arm support (6).
- 6) Unsolder the dew sensor (8) to separate the mode SW (7).
When soldering or unsoldering, take care so that the gear part (7)-a of mode SW is not damaged by the soldering iron.)
- 7) Remove the dew sensor ass'y (8) attached to the main chassis (9) with double-coated tape. At this time take due care so that the double-coated tape does not remain on the main chassis. (If it remains, clean the attaching part (9)-a of main chassis (9) with industrial methyl alcohol.)



● Mounting

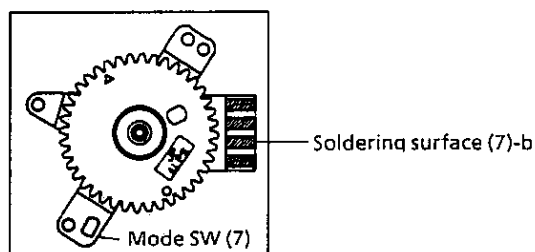
- 1) Ascertain that the soldering surface (7)-a of mode SW (7) is clean.
(If many solder remains, remove it.)
- 2) Clean the dew sensor attaching part (9)-a of main chassis (9) with alcohol.
- 3) Peel off the peeling paper at the rear side of dew sensor ass'y (8), align the S loading arm support mounting hole (9)-b (2 places) of main chassis (9) with the holes of dew sensor ass'y (8) (2 places), and apply it. After applying insert FPC(8)-a of dew sensor ass'y (8) at the rear side through the hole (9)-c of main chassis.
(When applying the dew sensor, take utmost care so as not to damage or contaminate the sensor surface. When applying, depress the periphery of dew sensor with unused swab or soft piece.)

- 4) Solder the mode SW (7) and dew sensor ass'y (8) (4 places).
(During soldering cover the upper part of dew sensor with paper or the like so as to prevent entry of flux. Take care so that the gear of mode SW is not damaged by the soldering iron. Be careful so that the solder does not touch the adjacent pattern.)
- 5) Engage the engaging part (6)-a of S loading support (6) with the main chassis (9), and tighten the 2 screws (5) (0.4 ± 0.02 kg.cm).
- 6) Referring to Figure 7-5-10(c), mount the drum base ass'y (4) on the main chassis (9), and tighten the 3 screws (0.8 ± 0.02 kg.cm).
- 7) Fix the PB-T1 holder spring (2) with the screw (1) (0.7 ± 0.02 kg.cm).
- 8) Apply the double-coated tape head amp FPC attached to the main chassis to fix.
- 9) Mount the FPC holder and head amp FPC.
- 10) When the drum base ass'y has been removed, be sure to check the tape travel and switching point, referring to item 7-7.



S loading arm support mounting hole (9)-b

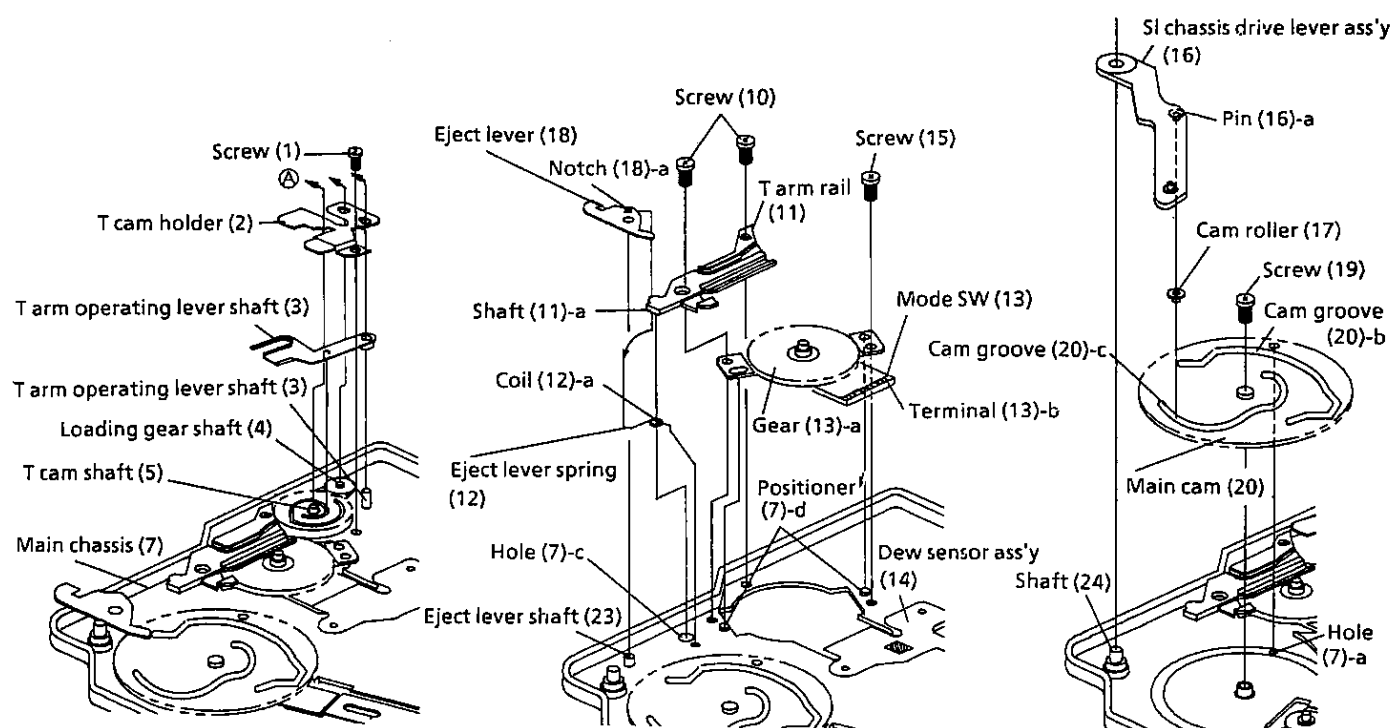
Dew sensor applying part (9)-a



7-5-13 REMOVING AND MOUNTING OF MODE SW

• Removal

- 1) Referring to item 7-5-11, remove the slide chassis.
- 2) Remove the screw (1), move the T cam holder (2) in the arrow (A) direction, and remove it. (Release the engaging part from the groove of loading gear shaft (4), T arm operating lever shaft (3), and T cam shaft (5).)
- 3) Remove the T arm operating lever (6).
- 4) Referring to item 7-5-12, remove the two screws, and remove the S loading arm support. (Take due care since the S loading arm support has a part to be engaged with the main chassis.)
- 5) Remove the two screws (10), and remove the T arm rail (11). The shaft (11)-a of T arm rail (11) serves as a guide of coil part (12)-a of eject lever spring (12). When removing, be careful so that the eject lever spring (12) is not lost.
- 6) Unsolder the mode SW (13) and dew sensor ass'y (14) to separate them. (When unsoldering, take due care so that the gear (13)-a of mode SW (13) is not damaged by the soldering iron. The performance of dew sensor (14) is impaired by contamination. Therefore, when soldering or unsoldering, cover the dew sensor (14) with paper so as to protect it from flux.)
- 7) Remove the screw (15), and remove the mode SW (13).
- 8) Remove the SL chassis drive lever ass'y (16) carefully so that the cam roller (17) is not lost.
- 9) Remove the eject lever (18) and eject lever spring (12).
- 10) Remove the screw (19), and remove the main cam (20).



● Mounting and phase setting

- 1) Mount the mode SW (13), aligning with the chassis positioner (two places) (7)-d, and tighten the one screw (15) (0.7 ± 0.02 kg.cm).
(When the mode switch is mounted, the dew sensor ass'y must be above the mode SW.)
- 2) Cover the upper part of dew sensor (14) with paper (do not use adhesive paper), and solder the 4 places of terminal (13)-b of mode SW (13) with due care so that the gear (13)-a of mode SW (13) is not damaged by the soldering iron. At this time take care so that the solder does not contact other adjacent pattern.
- 3) Arrange the marking (13)-c of gear of mode switch (13) so that it matches with the hole (7)-a of main chassis. (See Figure 7-5-13(a).)

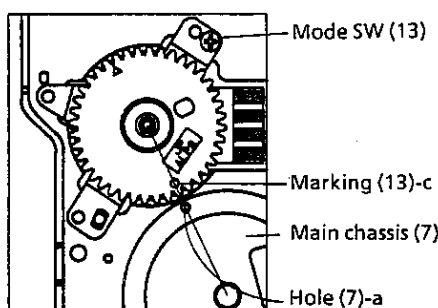


Figure 7-5-13(a)

- 4) Arrange the hole (20)-a of main cam (20) so that it matches with the hole (7)-a of main chassis, and tighten the screw (19) (0.7 ± 0.02 kg.cm).

At this time ascertain that the pinch cam roller shaft (22) of pinch drive lever ass'y (21) has been inserted into the cam groove (20)-b. (See Figure 7-5-13(b),(c).)

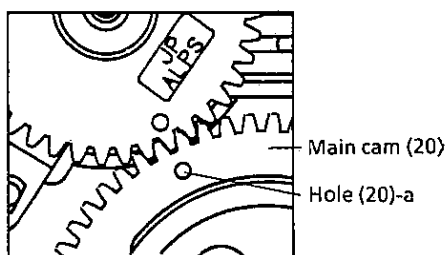


Figure 7-5-13(b)

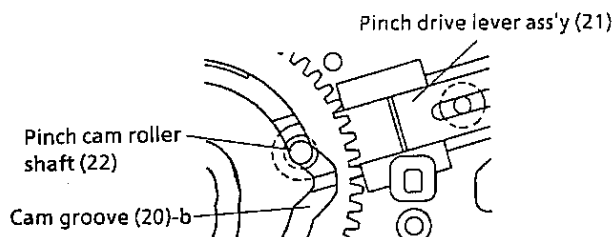


Figure 7-5-13(c)

- 5) Align the matchmark of T cam (8) with the matchmark of mode SW (13) to mount. (See Figure 7-5-13(d).)

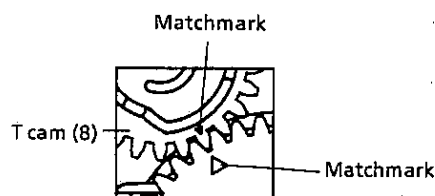


Figure 7-5-13(d)

- 6) Fit the T arm operating lever ass'y (6) to the shaft (3), and insert the pin (6)-a into the groove of T cam (8). (See Figure 7-5-13(e).)
- 7) Fit the Loading gear ass'y (9) to the shaft (4). (See Figure 7-5-13(d).)

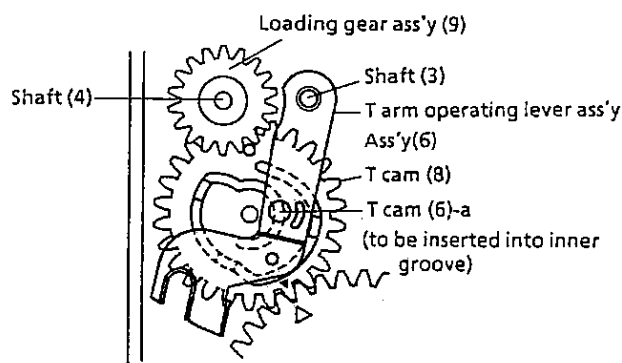


Figure 7-5-13(e)

- 8) Arrange the T cam holder (2) in the specified position, slide it in the arrow direction, and tighten the screw (1). (See Figure 7-5-13(f).)

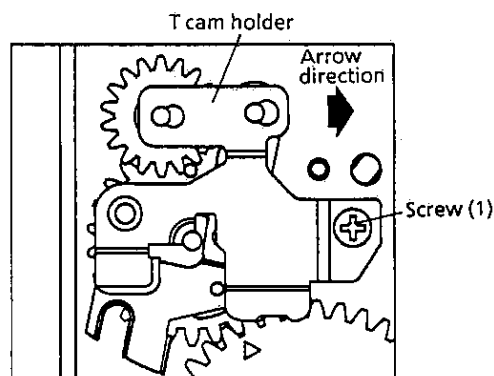
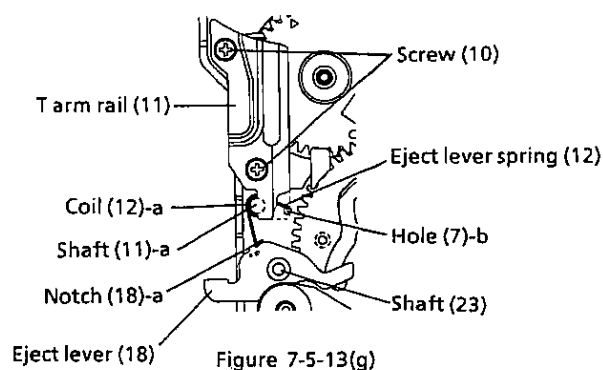


Figure 7-5-13(f)

- 9) Insert the one end of eject lever spring (12) into the hole (7)-b of chassis, then passing the shaft (11)-a of T arm rail (11) through the coil (12)-a of spring (12), fit it in the main chassis hole (7)-c, and tighten the two screws (10) (0.4 ± 0.02 kg.cm). (See Figure 7-5-13(g).)



- 10) Engage the end of eject lever spring (12) with the notch (18)-a of eject lever (18), and mount it on the shaft (23).
11) Mount the cam roller (17) on the pin part (16)-a of S1 chassis drive lever ass'y (16), mount the cam roller (17) in the cam groove (20)-c of main cam (20), and mount the SL chassis drive lever ass'y (16) on the shaft (24).
12) Referring to item 7-5-11, mount the slide chassis.

7-5-14 Parts which need utmost care when mounting

7-5-14-1 Pole base S1 ass'y

- 1) Insert the slide rail L between the pole base and the PBS1 slider as shown in Figure 7-5-14-1.

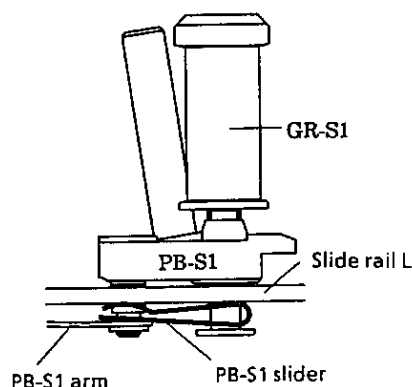


Figure 7-5-14-1

7-5-14-2 Tension wire ass'y

- 1) Carefully discriminating the front and rear sides of tension wire, mount it as shown in Figure 7-5-14-2.

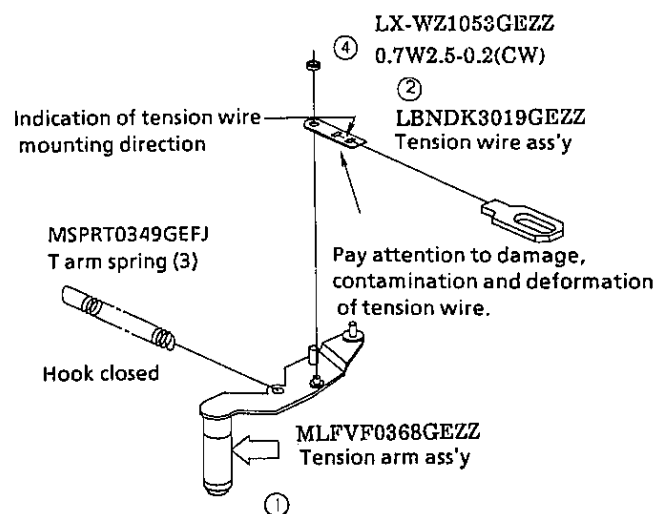


Figure 7-5-14-2

- 2) When mounting the tension wire on the slide chassis, take care so that it is not twisted.

7-5-14-3. Tu guide arm spring

- 1) Fit the center of Tu guide arm spring to the shaft of Tu guide arm as shown in Figure 7-5-14-3, and engage its both ends with the slide chassis and Tu guide operation pin.
2) Engagement of Tu guide operation pin must be as shown in Figure 7-5-14-3.

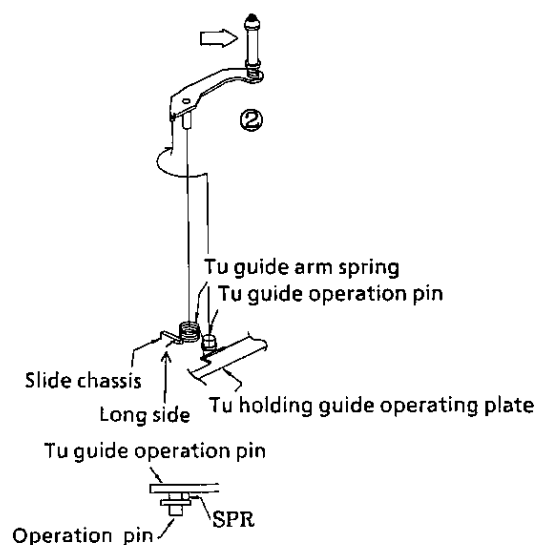


Figure 7-5-14-3

7-6. MEASURE TO TAKE IN CASE OF DISABLED EJECTION

- 1) Install the battery again after once removing it or connect the AC adaptor again after once disconnecting it, then reset the system controller to its initial state.
- 2) Turn on the power, and push down the EJECT button.

- 3) If the cassette control ass'y is not ejected even by taking the above steps, take the following:
 - ① Take out the mechanical unit alone by disassembling the VCR set.
 - ② Operate the mechanism by referring to "<Manually Operating the Mechanism>" described in Section 7-5.

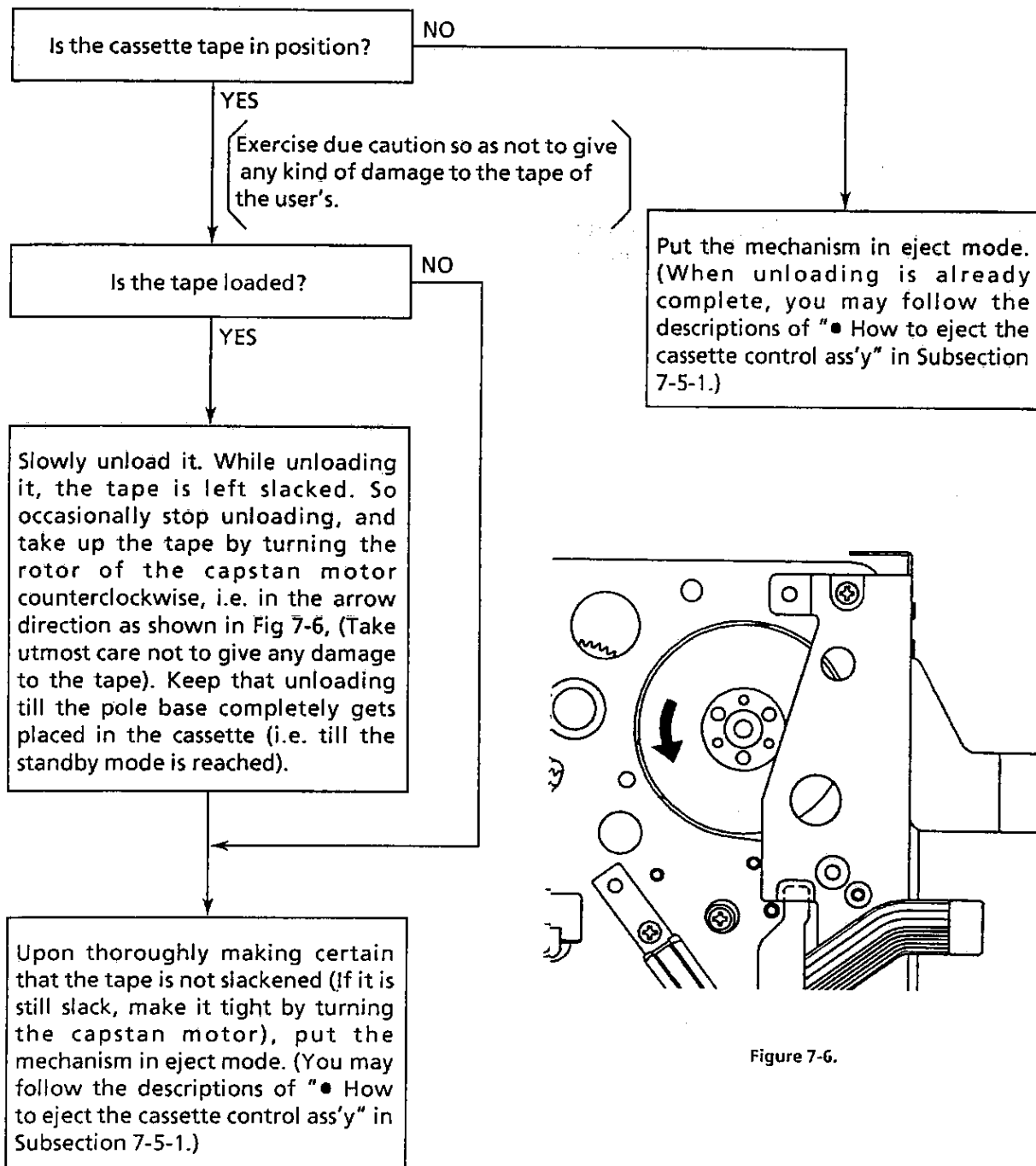


Figure 7-6.

7-7. TAPE TRAVEL ADJUSTMENT

The 8-mm VCR uses the ATF (an acronym of Automatic Track Finding) System which controls the tape travel speed according to the signals (four types) recorded on the tape.

This system, having made unnecessary the tracking adjusting controls needed by the VHS system VCRs, automatically performs tracking operation. The tape travel adjustment here, therefore, uses a jig (Track shift jig. See Note ①) which shifts the

tracking by the fixed amount (about 1/4) from the just tracking by forcing the ATF to operate.

Note ①

The track shift jig is used to connect a 4.9 kΩ resistor between Pins No. 11 and No. 2 of the test connector P35 of the VCR main PWB.

7-7-1. PRE-ADJUSTMENT PREPARATIONS AND TRAVEL SYSTEM CHECKING ADJUSTMENT

- 1) Clean the tape running surfaces (the tape guides, drum, capstan shaft, pinch roller, etc.).

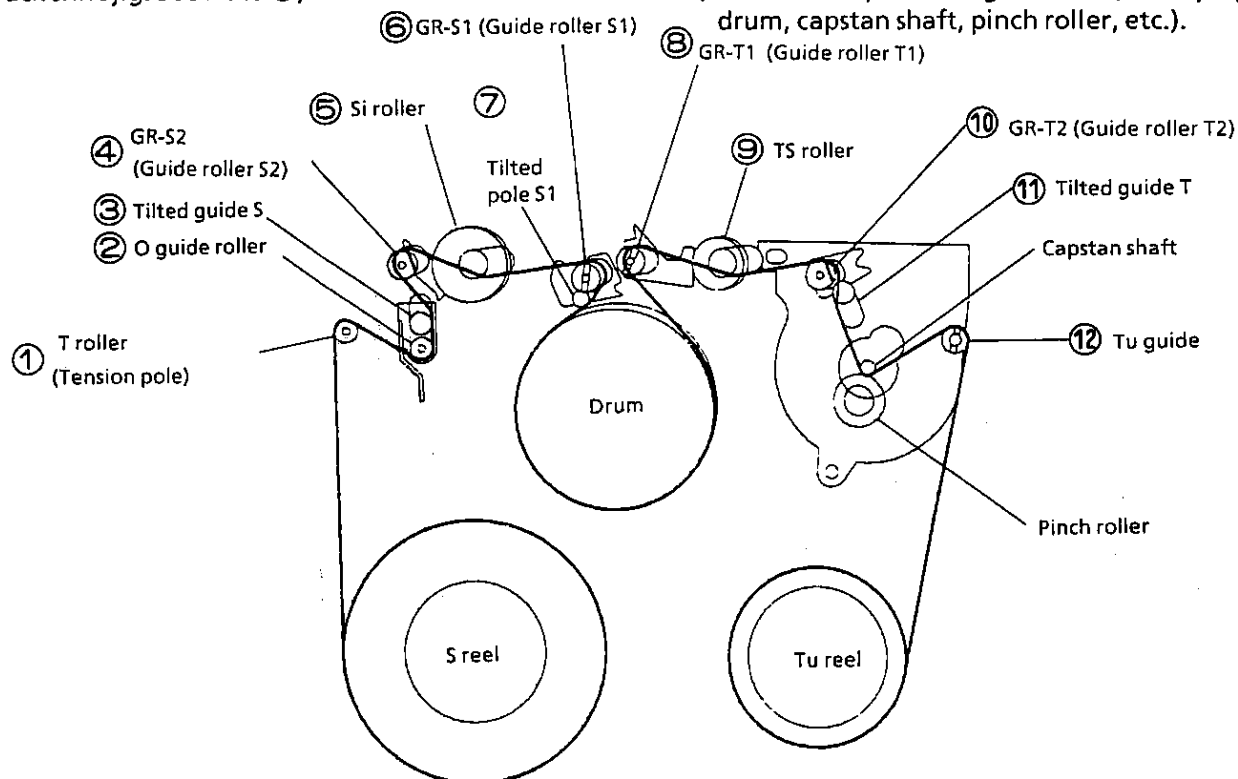


Figure 7-7-1(a). Tape Guide Allocation in Tape Travel System

- 2) Connect the signals to the oscilloscope (Use the test jig TEST2.):
Channel 1: Pin 4 of connector P 35 (Head amp PWB) for RF output.
Channel 2: Pin 3 of connector P 35 (Head amp PWB) for trigger signal.
GND: Pin 1 of connector P 35 (Head amp PWB) for ground.
- 3) Loosen the guide roller lock screws (See Fig. 7-7-1(b)), then retighten the lock screws to such extent that GR-S1 and GR-T1 can turn without strain. The adjustment will not be easy if the lock screw is too tight or too loose after retightened.

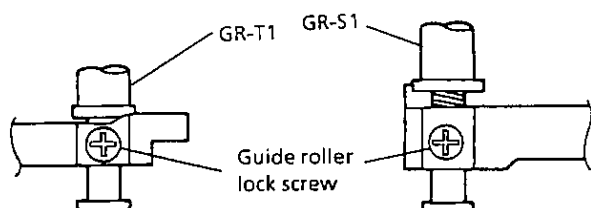


Figure 7-7-1(b).

- 4) Install the track shift jig to the test connector P13 of the VCR main PWB.

7-7-2. TAPE TRAVEL FINE ADJUSTMENT

- 1) After making sure that there is no trouble in the tape travel system, play back the adjustment tape (VR2 CB0PS). Check that the tape has no great curls at the tape guides.

Note :

JIGWR2-1CP and JIGWR5-1CP are compatible. To use them, perform the running adjustment according to the Service Manual for VL-MX7S/H/X/MX98E.

- 2) Observing the waveform of the RF output, shift the RF output by 1/4 by using the track shift jig, and check the flatness. If the waveform of the RF output is roughly flat when the output is shifted by 1/4, the result is satisfactory. If not, adjust GR-S1 and GR-T1. While the standard flatness is as shown by Fig. 7-7-2(a), adjust the waveform as flat as possible.

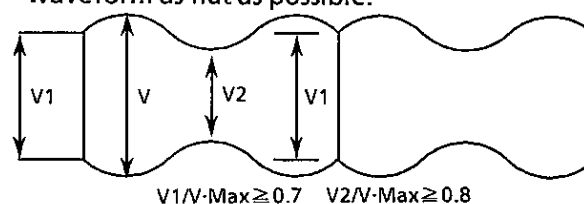


Figure 7-7-2(a).

3) Supply side travel adjustment (GR-S1)

Check that the waveform changes at the supply side of the drum while kept in similar Fig. when the RF output is shifted by 1/4 by the track shift jig. If not, the height of GR-S1 needs proper adjustment. Adjust it till the changed waveform gets as similar to the original Fig. as possible.

Supply side of the drum

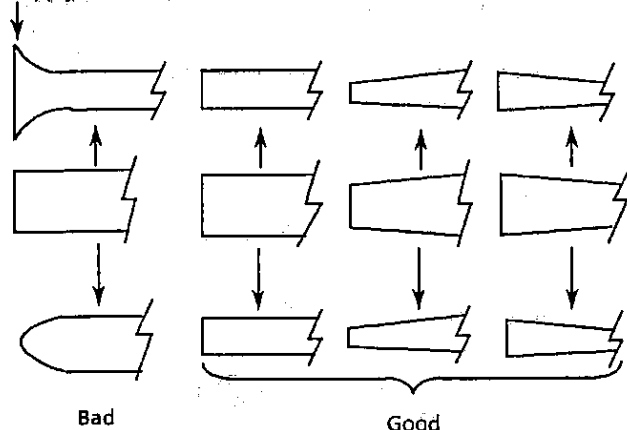


Figure 7-7-2(c).

4) Take-up side travel adjustment (GR-T1)

Like the supply side travel adjustment, adjust the height of GR-T1 till the changed waveform gets as similar to the original Fig. as possible. (See Fig. 7-7-2(e)).

Take-up side of the drum

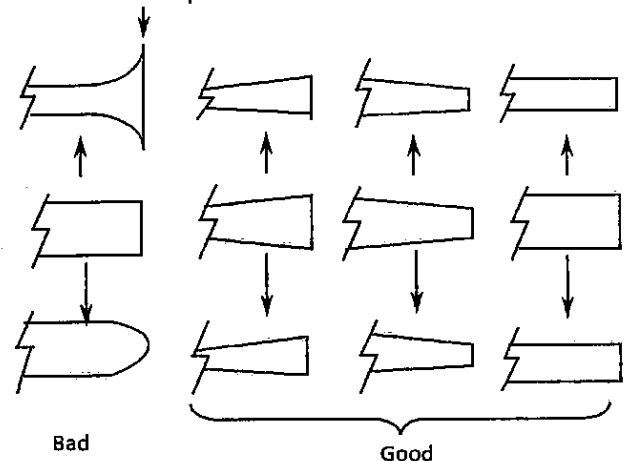


Figure 7-7-2(d).

5) After ending Steps 3) and 4), fine-adjust GR-S1 and GR-T1 so that by generally observing the waveform of the RF output, the waveform gets as flat as possible when the RF output is made maximum as well as when it is shifted by 1/4.

6) After completing the adjustment, lock GR-S1 and GR-T1 by tightening the guide roller lock screw (See Fig. 7-7-1(b)). Make sure at this point that the RF waveform does not vary.

7) Remove the track shift jig from the VCR main PWB.

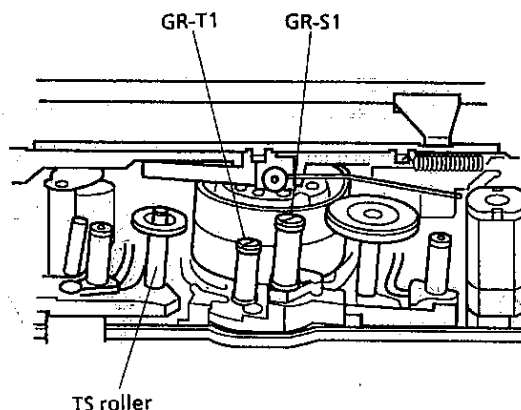


Figure 7-7-2(e).

7-7-3. CHECKING AND ADJUSTING THE PLAYBACK SWITCHING POINT

Refer to the items of "PW SWITCHING POINT ADJUSTMENT" in ADJUSTMENT OF VCR SECTION.

8. ADJUSTMENT OF VCR SECTION AND LCD SECTION

Before starting electric circuit adjustment

- Electric circuit adjustment becomes necessary, in most cases, when any of the wearable mechanical parts or the video head is replaced. Before starting electric circuit adjustment, be sure to check that the mechanical parts work perfect (i. e. the mechanical parts all been perfectly adjusted). In case a trouble or troubles are found in the electric circuits, be sure to down the cause(s) by using measuring instruments as described below. After locating the cause(s), then proceed to repair, replacement, or adjustment. Do not perform adjustments when adequate measuring instruments are not available.
- In order to implement a higher-density, smaller machine, most of the electric circuit parts used within the PWB units are of small-sized, surface-mounted type. For replacing part(s) as after-sale service, work with a soldering iron as speedily as possible. The heatresistance of the surface-mounted components is poor when compared with the larger-sized discrete parts used for television sets and stationary decks owing to their small sizes. Therefore, exercise due care so as to avoid long-time exposure of the poles of these parts to the heat of the soldering iron which may possibly cause them to have a trouble. Care should be exercised especially for chip-layer capacitor replacement. It is advisable to use a temperature-controlled ceramic soldering iron (Temperature at the tip: 250°C. Contacting time: Less than 5 seconds).

< Adjusting the liquid crystal video system >

Measuring instruments and others:

- Color monitor TV set
- Digital voltmeter
- DC power supply
- Audio generator (CR oscillator)
- Alignment tapes
- JIGWR5-9CS (Y/C system adjustment) (Servo adjustment) (SP, stereo standard tape)
- JIGWR5-8CSE (Hi-8 Y/C system adjustment)
- AC adapter
- Stereo AV output cable (Supplied accessory)
- Oscilloscope
- Frequency counter
- Signal generator (PAL pattern generator LCG-399: LEADER make)
- Video recording tape
- Vector scope
- DC cable (Supplied accessory)
- Video system extension cable

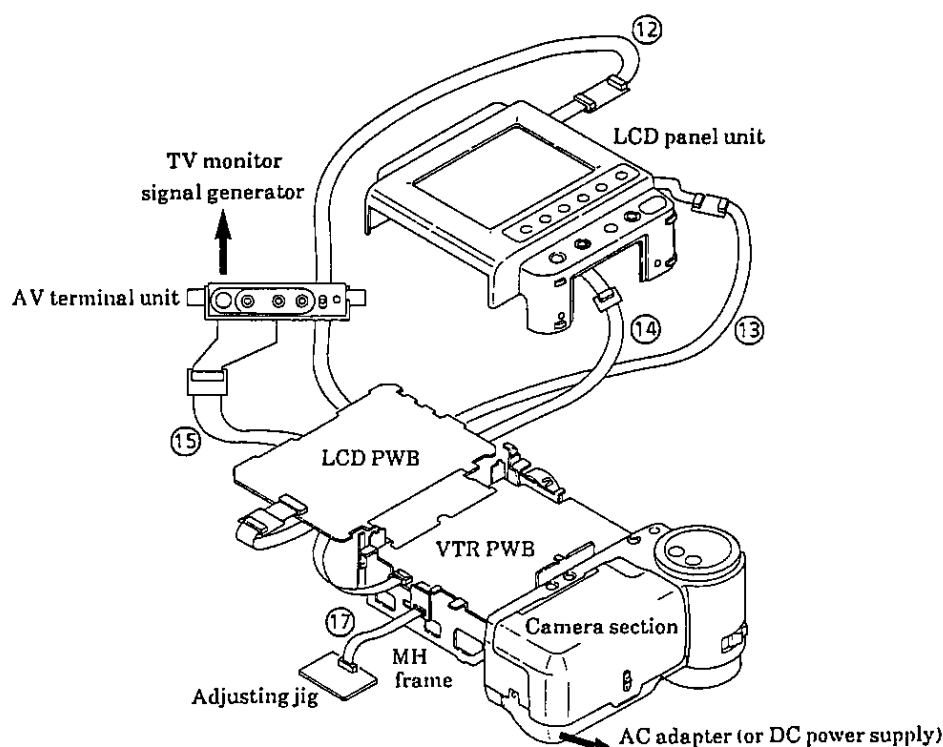
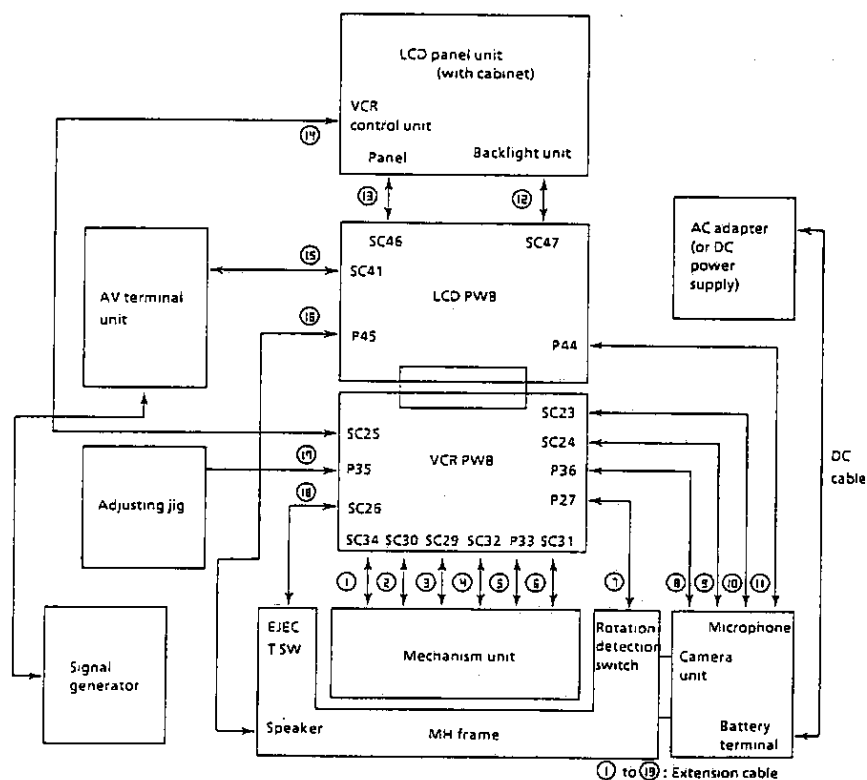


Figure 8-A-1 VCR adjusting cable

| VCR.LCD extension cable | | | | |
|-------------------------|---|------------|---|------------------|
| No | Part code | Price code | Connecting point | Connector name |
| ① | QPWBH2350TAZZ | BE | VCR PWB - Mechanism R.T FPC (16P) | SC34~FPC |
| ② | QPWBH2347TAZZ | BF | VCR PWB - Mechanism CP.M FPC (18P) | SC30~FPC |
| ③ | QPWBH2348TAZZ | BD | VCR PWB - Mechanism D.M FPC (12p) | SC29~FPC |
| ④ | QPWBH2349TAZZ | BB | VCR PWB - Mechanism mode switch FPC (6P) | SC32~FPC |
| ⑤ | QCNW-1226TAZZ | AW | VCR PWB - Mechanism L.M wire (2P) | P33~L.M |
| ⑥ | QPWBH2379TAZZ | BE | VCR PWB - Mechanism sensor FPC (17P) | SC31~FPC |
| ⑦ | QCNW-1226TAZZ | AW | VCR PWB - Rotation detection switch wire (2P) | P27~R.S |
| ⑧ | QCNW-1229TAZZ | AW | VCR PWB - Battery terminal wire (2P) | P36~B.T |
| ⑨ | QPWBH2428TAZZ | BN | VCR PWB - Camera FPC (14P) | SC24~FPC |
| ⑩ | QPWBH2429TAZZ | BN | VCR PWB - Camera FPC (16P) | SC23~FPC |
| ⑪ | QCNW-1223TAZZ | AM | LCD PWB - Microphone wire (3P) | P44 - Microphone |
| ⑫ | QPWBH2349TAZZ | BB | LCD PWB - Backlight unit (6P) | SC47~FPC |
| ⑬ | QPWBH2347TAZZ | BF | LCD PWB - LCD panel (18P) | SC46~FPC |
| ⑭ | QCNW-1238TAZZ | AW | VCR PWB - VTR control unit (6P) | SC25~FPC |
| ⑮ | QCNW-1239TAZZ | AZ | LCD PWB - AV terminal unit (20P) | SC41~FPC |
| ⑯ | QCNW-1226TAZZ | AW | LCD PWB - Speaker (2P) | P45~S.P |
| ⑰ | QPWBN2408TAZZ
or
QPWBF2450TAZZ
QCNW-1292TAZZ | BY
BF | Adjusting jig | P35 |
| ⑱ | QCNW-1240TAZZ | AW | VCR PWB - Eject switch (3P) | SC26~FPC |

Table 8-B-1



Basic connection diagram for VCR.LCD section servicing

Figure 8-A-2

Precautions

As for the extension cable, the current model and others are also partly used. Therefore, the information described on the label attached to the extension cable corresponds to the previous models. When using this machine, interpret the information shown on the label as follows.

| No. | Parts code | Information on label | | Remarks |
|-----|---------------|--------------------------------|----------------------------------|---------|
| | | Previous models | VL-HL series | |
| ① | QPWBH2350TAZZ | K3886HE
K3891HE
SC20 | K4051HE
SC34 | |
| | | DMECV1020GE
MEC. SENSOR FPC | DMECV1020GE
HEAD FPC | |
| ② | QPWBH2347TAZZ | K3886HE
K3891HE
SC30 | K4051HE
SC30 | |
| | | DMECV1020GE
CAP. MOTOR WIRE | DMECV1020GE
CAP. MOTOR FPC | |
| ③ | QPWBH2348TAZZ | K3886HE
K3891HE
SC29 | K4051HE
SC29 | |
| | | DMECV1020GE
DRUM MOTOR FPC | ← | |
| ④ | QPWBH2349TAZZ | K3886HE
K3891HE
SC21 | K4051HE
SC32 | |
| | | DMECV1020GE
MODE SW FPC | ← | |
| ⑥ | QPWBH2379TAZZ | K3917HE
SC20 | K4051HE
SC31 | |
| | | DMECV1020GE
MECA SENSOR FPC | ← | |
| ⑦ | QCNW-1226TAZZ | K4051HE
P33 | K4051HE
P27 | |
| | | DMECV1020GE
LOAD. MOTOR | LCD REW SW
QSW-Z0052TAZZ | |
| ⑪ | QCNW-1223TAZZ | K2358PM
K2404PM
P6 | K4052HE
P44 | |
| | | AUDIO CABLE | ← | |
| ⑫ | QPWBH2349TAZZ | K3886HE
K3891HE
SC21 | K4052HE
SC47 | |
| | | DMECV1020GE
MODE SW FPC | BACK LIGHT UNIT
RUNTK0288TAZZ | |
| ⑬ | QPWBH2347TAZZ | K3886HE
K3891HE
SC30 | K4052HE
SC46 | |
| | | DMECV1020GE
CAP. MOTOR WIRE | LCD PANEL
RUNTK0359CE01 | |
| ⑯ | QCNW-1226TAZZ | K4051HE
P33 | K4052HE
P45 | |
| | | DMECV1020GE
LOAD. MOTOR | SPEAKER
VSP0028P-25YN | |

USAGE OF ADJUSTMENT MODE SETTING JIG (QPWBN2408TAZZ or QPWBF2450TAZZ, QCNW-1292TAZZ)

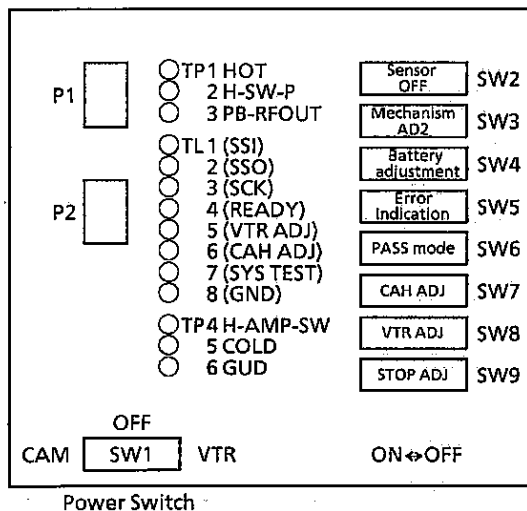


Figure 8-A-3

1. Connect the jig to the connector P35 of VCR PWB (DUNTK4051HE01).
2. Set the SW1 to camera side or VCR side, and turn on power supply.
3. Using the SW2 to SW9, set the pertinent test mode.

SW ON:

Mechanism sensor OFF mode

→ This mode is used to actuate the mechanism PWB without tape.

SW3 ON:

Mechanism adjustment mode

→ This mode is used to adjust the mechanism.

SW4 ON:

Battery adjustment mode

→ This mode is used to adjust the battery sensor.

SW5 ON:

Error display mode

→ This mode is used to display the encountered error on the LCD screen or battery adjustment error.

SW6 ON:

PASS mode

→ This mode is used to make tracking shift when adjusting travel.

SW7 ON:

Camera adjustment mode

→ This mode is used to adjust the camera section.

SW8 ON:

VTR adjustment mode

→ This mode is used to adjust the VCR section.

SW9 ON:

H-SW-P adjustment mode

→ This mode is used for automatic adjustment of H-SW-P. usually, adjustment must be made in the VTR adjustment mode by the specified adjusting method.

The switch (SW2 to SW9) having larger SW number is preferred to the switch having smaller SW number (for example, SW4 has higher priority to SW2).

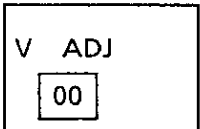
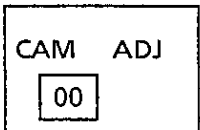
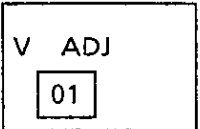
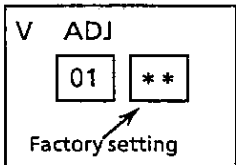
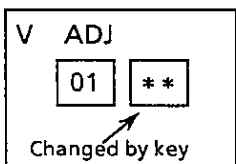
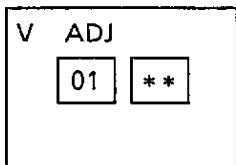
4. After completion of adjustment turn off the pertinent switch, and disconnect the jig.

8-1. EEPROM ADDRESS/DATA SETTING

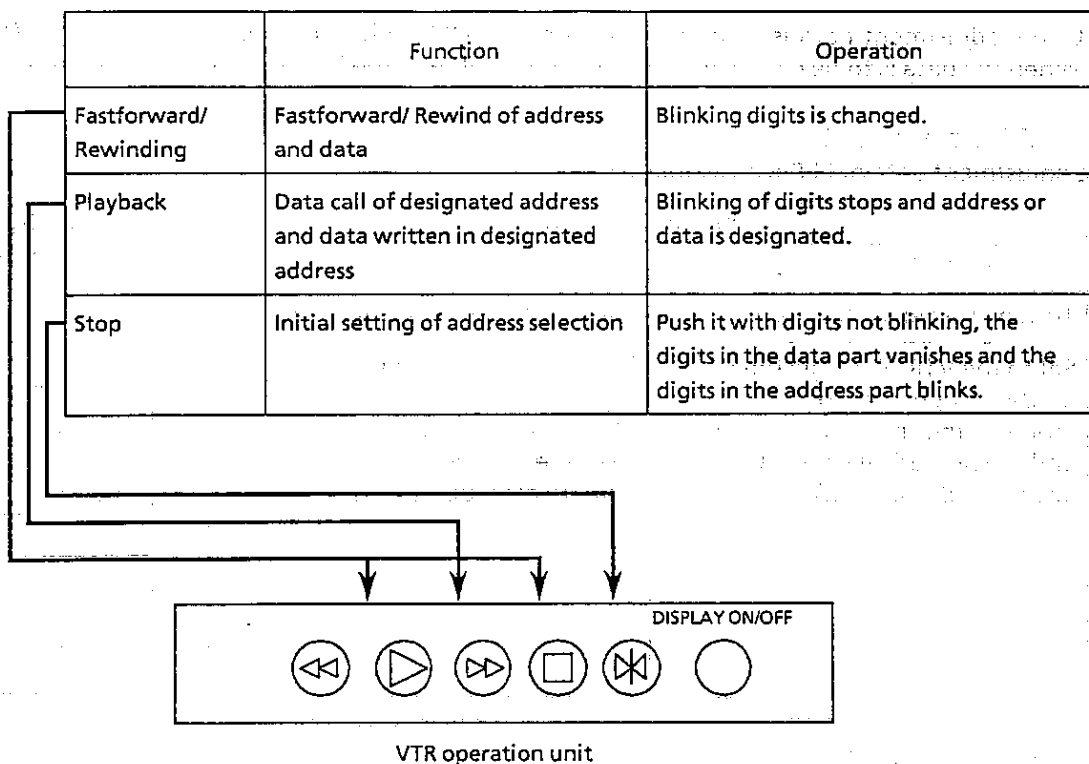
In this unit, the adjustment data is memorized in the EEPROM which comprises two systems; VTR LCD and CAMERA. When the data is to be changed, the adjustment value of the EEPROM must be changed.

8-1-1. OPERATION PROCEDURE

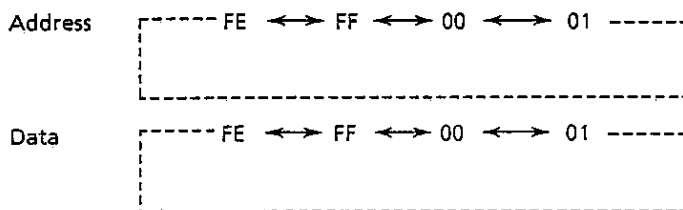
Setting the adjustment data of EEPROM as follows.

| No. | Operation procedure | | Monitor display
(☐ indicates blinking) |
|-----|--|--|---|
| | VTR LCD adjustment | CAMERA adjustment | |
| 1 | Turn on power sw to video. | Turn on power sw to camera. | |
| 2 | Set to the VTR LCD adjustment mode. In upper left of the monitor, the character "V ADJ" and the numerical value "00" appear and "00" blinks. | Set to the camera signal adjustment mode. In upper left of the monitor, the character "CAM ADJ" and the numerical value "00" appear and "00" blinks. | VTR LCD

CAMERA
 |
| 3 | Then push "Fastforward" (or "Rewind" key, the address is changed and "01" blinks. (Address call) | |  |
| 4 | Then push "Playback" key, "01" blinking stops and the data appears in the data display.(Data call) | |  |
| 5 | Then push "Fastforward" (or "Rewind" key, the digits changes with blinking in the data display. According to the adjustment procedure, set the numerical value to the specified value. | |  |
| 6 | Then push "Playback" key, newly changed data is written in the address and the data blinking stops. | |  |
| 7 | If further adjustment is required, repeat from the step 3. | | |

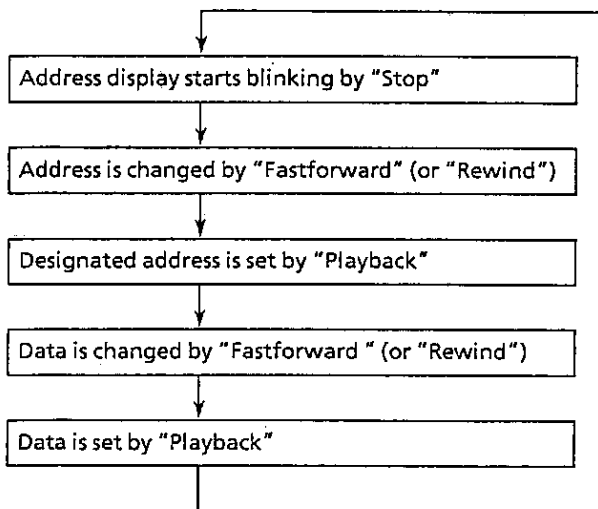
The functions of operation switches are as follows:



- * If pushing "Fastforward" (or "Rewind") is kept for over 0.3 seconds, the operation is repeated. At the data change, if pushing is kept further for more than 2 seconds, the data is changed by ± 4 . The selection order of address and data indicated by bioctonal system is shown below.



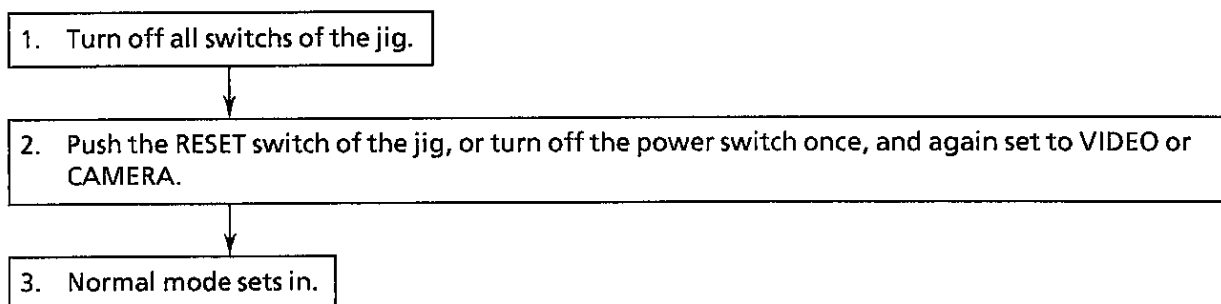
- * Operation of plural change



Notes:

- (1) The data other than the data to be changed must be unchanged.
- (2) In the adjustment mode, do not touch the other keys unrelated to the adjustment.
In case that the call and the change of the adjustment data can not be operated, release the adjustment mode and repeat the adjustment mode setting according to the above procedure.

8-1-2. RETURNING TO THE NORMAL MODE



VTR LCD system adjustment data sheet

| Address | Item | | Address | Item | |
|---------|-------------------|-------|---------|------------------------|-------------------|
| 03 | 16.5V voltage | Power | 16 | B-W/B | |
| 04 | Y level | | 17 | VCO | |
| 05 | Comb filter gain | | 18 | Horizontal position | |
| 06 | Comb filter phase | | 19 | Common voltage | |
| 08 | Emphasis | | 1A | Main fo | Audio |
| 09 | Carrier | | 1B | Sub fo | Audio |
| 0A | Deviation | | 1C | Main deviation | Audio |
| 0B | Carrier (Hi8) | | 1D | Sub deviation | Audio |
| 0C | Deviation (Hi8) | | 1E | Matrix | Audio |
| 0D | REC chroma | | 23 | Burst Phase | |
| 0F | REC Y | | 24 | Back light control | |
| 10 | REC Y (Hi8) | | 25 | Heater control | |
| 11 | Deemphasis | | 7A | Head switching point | System controller |
| 12 | Deemphasis (Hi8) | | 7B | (7A + 7B and FF) | Servo |
| 13 | PB level | | 7C | Battery sensor voltage | System controller |
| 14 | Contrast | | 7D | (7C + 7D and FF) | Servo |
| 15 | R-W/B | | | | |

VL-H400S/H/X
VL-H9E

The addresses from 48 to 4F cover the time accumulating value of the drum motor, capstan motor and cassette eject. It should be referred to for servicing.

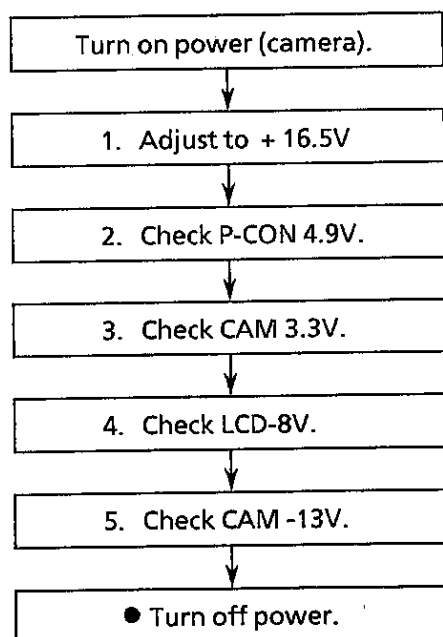
| Addr. | Data | Item | | |
|-------|---------------|---------------------|----------------------|--|
| 48 | OPE TIME(1) L | Drum motor | Total operation time | unit: second
(0-FFFFF: Max 16770000sec. = 4660 hours) |
| 49 | M | | | |
| 4A | H | | | |
| 4B | OPE TIME(2) L | Capstan motor | Total operation time | unit: second
(0-FFFFF: Max 16770000sec. = 4660 hours) |
| 4C | M | | | |
| 4D | H | | | |
| 4E | EJECT CNT L | Cassette eject time | | unit: time (Max 65535 times) |
| 4F | H | | | |

* The code numbers for the addresses 72h and 73h are different depending on the models. Do not change the code number corresponding to the related model, otherwise the unit does not operate normally.

| | Address 72h | Address 73h |
|----------|-------------|-------------|
| VL-H400S | 02 | FD |
| VL-H400H | 02 | FD |
| VL-H9E | 03 | FC |
| VL-H400X | 04 | FB |

8-2. POWER CIRCUIT ADJUSTMENT

8-2-1. POWER CIRCUIT ADJUSTMENT PROCEDURE



8-2-2. POWER CIRCUIT ADJUSTMENT METHOD

- Input 6V from the battery terminal, and set the power switch to the camera side.

1. Adjustment to + 16.5V

| | |
|----------------------|-----------------------|
| Measuring instrument | Digital voltmeter |
| Measuring terminal | SC23(10) pin or TL748 |
| Adjustment address | 03 |
| Standard | 16.5V $\pm$ 0.1V |

- 1) Make an adjustment so that the digital voltmeter indicates 16.5V $\pm$ 0.1V.

2. Checking of P-CON4.9V

| | |
|----------------------|-----------------------|
| Measuring instrument | Digital voltmeter |
| Measuring terminal | W21(79) pin or TL3489 |
| Adjustment address | |
| Standard | 4.87V $\pm$ 0.05V |

- 1) Check that the digital voltmeter indicates 4.87V $\pm$ 0.05V.

3. Checking of CAM3.3V

| | |
|----------------------|----------------------|
| Measuring instrument | Digital voltmeter |
| Measuring terminal | SC23(8) pin or TL747 |
| Adjustment address | |
| Standard | 3.3V $\pm$ 0.1V |

- 1) Ascertain that the digital voltmeter indicates 3.3V $\pm$ 0.1V.

4. Checking of LCD-8V

| | |
|----------------------|-------------------|
| Measuring instrument | Digital voltmeter |
| Measuring terminal | W21 pin |
| Adjustment address | |
| Standard | -8.2V $\pm$ 0.5V |

- 1) Ascertain that the digital voltmeter indicates - 8.2V $\pm$ 0.5V.

5. Checking of CAM-13V

| | |
|----------------------|----------------------|
| Measuring instrument | Digital voltmeter |
| Measuring terminal | SC23(9) pin or TL742 |
| Adjustment address | |
| Standard | -16.3V $\pm$ 1V |

- 1) Ascertain that the digital voltmeter indicates - 16.3V $\pm$ 1V.

- Turn off power supply.

8-3. ADJUSTMENT OF SYSTEM CONTROLLER AND SERVO CIRCUIT

8-3-1. ADJUSTMENT OF PLAYBACK SWITCHING POINT

| Item | Adjusting method |
|----------------------|--|
| Measuring instrument | Oscilloscope |
| Mode | Playback |
| Measuring terminal | GND TP1405
H-SW-P servicing, adjusting jig
TP2 or W21(14) pin
(TL3424)
Video output TP1401 |
| Adjustment | 7Ah 7Bh |
| Tape | Alignment tape
(JiGWR5-9CS) |

In the address 7Bh, the value FFh minus 7Ah is written.

- 1) Connect each signal to the oscilloscope.
(Use the P37 connector lead-out wire.)
1 c h : TP1401 video output
2 c h : H-SW-P...Trigger signal
G N D : TP1405...GND
- 2) Play back the adjustment tape (JiGWR5-9NS).
- 3) Set the synchronization slope of oscilloscope to (-), and adjust so that the interval between the trigger point and the V synchronizing signal becomes equal to 6H. (Figure 8-3-1)
- 4) Then set the synchronization slope to (+), and ascertain that the interval between the trigger point and the V synchronizing signal is 6H. (Figure 8-3-2)

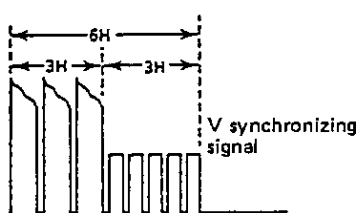


Figure 8-3-1

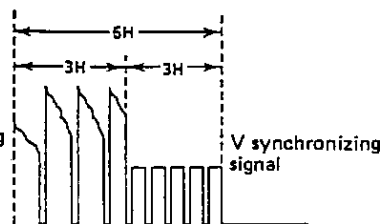


Figure 8-3-2

8-3-2. ADJUSTMENT OF BATTERY ALARM

| Item | Adjusting method |
|-----------------------|-----------------------------------|
| Mode | Camera record |
| Measuring place | |
| Adjustment address 01 | 7Ch 7Dh |
| Standard | LCD counter indication
LCD + 0 |
| Jig | QCNW-1165TAZZ |

In the address 7Dh, the value FFh minus 7Ch is written.

- 1) Connect the adjusting jig for servicing to P35 (TEST2 connector).
- 2) Turn on SW(4) of adjusting jig for servicing, and set the battery alarm adjustment mode.
- 3) Set the power voltage to 5.40V at TL953 input side.
- 4) Turn on the power switch in the camera mode.
- 5) Press the playback key switch (VTR operation key switch).
- 6) The battery indication appears on the LCD screen and then disappears. Thus, the adjustment has been finished.

8-3-3. ERROR MESSAGE

For easier troubleshooting and test the special function has been provided.

8-3-3-1. ERROR MESSAGES

When the sensor is actuated, error data is sent to the display microcomputer, and a specific number is displayed on the counter display of view finder.

| No. | Description |
|------|---|
| E007 | CAP GF is not input for more than 1 sec. |
| E011 | The operation mode cannot be changed to the next mode although L/M is normally rotating for more than 5 sec (or 10 sec). |
| E012 | The operation mode cannot be changed to the next mode although L/M is rotating inversely for 5 more than sec (or 10 sec). |
| E020 | DRUM FG is not input for more than 100 nsec. |
| E025 | The TU reel sensor was actuated. |
| E026 | The SU reel sensor was actuated. |

Note:

The errors E020, 025 and 026 occur due to tape damage or condensation rather than due to machine trouble. Therefore, when error E020, 025 or 026 occurs, be sure to once take out the cassette, and try playback again to check operation.

8-4. Y/C SYSTEM ADJUSTMENT

8-4-1. Y/C CIRCUIT ADJUSTING PROCEDURES

● Input Signal Conditions

Instrument set-up

For electrical adjustments of the Y/C circuit, a pattern generator is used to feed the video signal. It is important that the video signal output is as specified. Connect the oscilloscope to the video input and output terminals. Make sure the oscilloscope waveform of the video signal is as follows: video sync signal's amplitude at about 0.3 Vp-p; video portion's amplitude at about 0.7 Vp-p; burst signal amplitude at about 0.3 Vp-p and its top and bottom as flat as possible; and the level ratio of the burst signal to the red bar at 0.30 : 0.66. Figure A. shows the video signal waveform for the standard color bars.

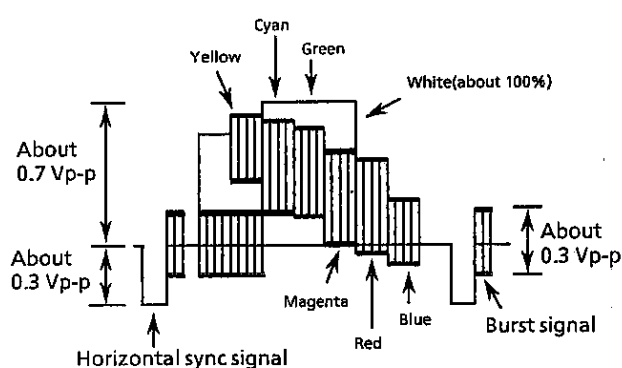


Figure A.

Color bar signal from pattern generator

※ When there is no Pattern Generator Available:

In this case, shoot a color bar chart (JIGCHART-4) with a completely adjusted camcorder. Set the illumination so that the camcorder's video signal output (terminated with 75-ohm impedance) is as shown in Figure B. This color bar signal can be used as an input signal for electrical adjustments.

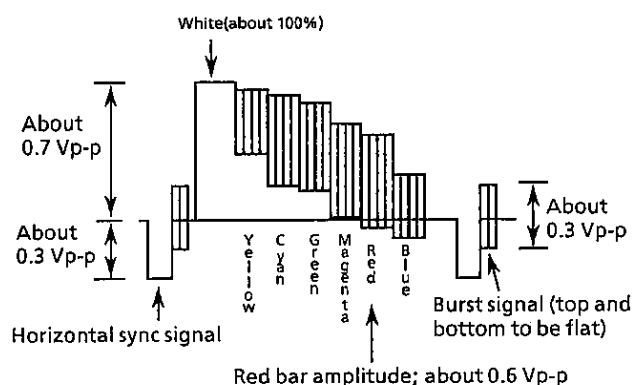


Figure B.

Color bar signal obtained by camcorder

For VL-H400S/H, take the following procedure before Y/C circuit adjustment. (It is unnecessary for VL-H400X/H9E.)

- 1) Set the unit to VTR adjustment mode by using adjustment jig.
Then set the following addresses and data by operation switch.

| address | data |
|---------|------|
| 72 | 04 |
| 73 | FB |

- 2) Remove the battery or disconnect the AC adaptor once, and then set them again. (Check that the lithium battery has been removed then.)
- 3) Start Y/C circuit adjustment.

1. Adjustment of input level

| | |
|----------------------|----------------------|
| Measuring instrument | Oscilloscope |
| Mode | VCR STOP |
| Input signal | Color bar (Figure A) |
| Measuring point | TP1401 |
| Adjustment address | 04 |
| Set point | 2.0 ± 0.1 Vp-p |

- 1) Set the input/Output Selection Menu to Input.
- 2) Set the VCRSTOP mode.
- 3) Input the color bar signal from the video input/output terminal.
- 4) Set the VTR adjustment mode, using the adjusting jig, and set the address with the control switch.
- 5) Make an adjustment with Fast Forward/Rewind key so as to get 2.0Vp-p between sync tip and White on TP1401.

Notes:

- When adjustment is made by inputting the video input into the video input/output terminal, do not connect the S cable to the S terminal. If this cable is connected, signal cannot be input.
- When the adjusting jig is used, don't use the main body power switch (off state), but use the power switch of jig.

2. Adjustment of comb filter

| | |
|----------------------|----------------------|
| Measuring instrument | Oscilloscope |
| Mode | VCR STOP |
| Input signal | Color bar (Figure A) |
| Measuring point | TP402 |
| Adjustment address | Phase: 06 Gain: 05 |
| Set point | Chroma level min. |

- 1) Set address, using the operation switch.
- 2) Make an adjustment with the operation switch in order of Phase - Gain - Phase so as to minimize the residual chroma component on TP402.

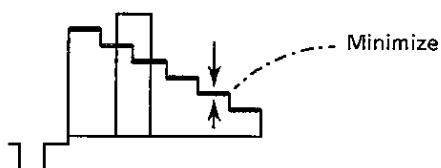


Figure 8-4-1

3. Adjustment of preemphasis input level

| | |
|----------------------|--------------------------|
| Measuring instrument | Oscilloscope |
| Mode | VCR STOP |
| Input signal | Color bar (Figure A) |
| Measuring point | TP403 |
| Adjustment address | 08 |
| Set point | $500 \pm 20\text{mVp-p}$ |

- 1) Set address, using the operations switch.
- 2) Make an adjustment with the operation switch R493 so as to get 500mVp-p between sync tip and White on TP403.

4. Adjustment of deemphasis input (normal)

| | |
|----------------------|---|
| Measuring instrument | Oscilloscope |
| Mode | Playback |
| Tape | Standard tape (JiGWR5-9CS)
Color bar state |
| Measuring point | TP406 |
| Adjustment address | 11 |
| Set point | $500 \pm 25\text{mVp-p}$ |

- 1) Once cancel the VTR adjustment mode of adjusting jig, set the output mode, set the standard tape, and play back the color bar part.
- 2) Set the VTR adjustment mode with the adjusting jig, and set the address with the operation switch.
- 3) Make an adjustment with the operation switch so as to get 500mVp-p between sync tip and White on TP406.

5. Adjustment of deemphasis (Hi-8)

| | |
|-----------------------|--|
| Measuring instrument. | Oscilloscope |
| Mode | Playback |
| Tape | Standard tape (JiGWR5-8CSE)
Color bar state |
| Measuring point | TP406 |
| Adjustment address | 12 |
| Set point | $500 \pm 25\text{mVp-p}$ |

- 1) The same as stated in item 5-1), 2), and 3).

6. Adjustment of PB-Y level (Hi-8)

| | |
|----------------------|--|
| Measuring instrument | Oscilloscope |
| Mode | Playback |
| Tape | Standard tape (JiGWR5-8CSE)
Color bar state |
| Measuring point | TP1402 |
| Adjustment address | 13 |
| Set point | $2.0 \pm 0.1\text{Vp-p}$ |

- 1) Set address with the operation switch.
- 2) Make an adjustment with the operation switch so as to get 2.0Vp-p between sync tip and White on TP1402.

7. Adjustment of YFM carrier (normal)

| | |
|----------------------|---------------------|
| Measuring instrument | Frequency counter |
| Mode | VCR STOP |
| Input signal | No signal |
| Measuring point | TP404 |
| Adjustment address | 09 |
| Set point | 4.38 ± 0.02 MHz |

- 1) Cancel the VTR adjustment mode with the adjusting jig, and set the VCR STOP mode.
- 2) Set address with the operation switch.
- 3) Set video input to "NOINPUT".
- 4) Make an adjustment with the operation switch so that the frequency counter indicates 4.38 MHz on TP408.

8. Adjustment of YFM carrier (Hi-8)

| | |
|----------------------|---------------------|
| Measuring instrument | Frequency counter |
| Mode | VCR STOP |
| Input signal | No signal |
| Measuring point | TP404 |
| Adjustment address | 0B |
| Set point | 5.98 ± 0.02 MHz |

- 1) The same as stated in item 8-1)
- 2) The same as stated in item 8-2)
- 3) Set video input to "NOINPUT".
- 4) Make an adjustment with the operation switch on TP404 so that the frequency counter indicates 5.98 MHz.

9. Adjustment of YFM deviation (normal)

| | |
|----------------------|----------------------|
| Measuring instrument | Oscilloscope |
| Mode | VCR REC/PB |
| Input signal | Color bar (Figure A) |
| Measuring point | TP1401 |
| Adjustment address | 0A |
| Set point | 2.0 ± 0.1 Vp-p |

- 1) Once cancel the VTR adjustment mode with the adjusting jig.
- 2) Set the normal tape.
- 3) Record the color bar signal, and stop at proper length to set the program top.
(Push BLC button when recording by VL-H400S/H.)
- 4) Display the menu on the screen, and set the input/output selection to OUTPUT mode.
- 5) Play back the record, and measure the part between sync tip of TP1402 and White.
- 6) Set the VTR adjustment mode with the adjusting jig, and set address with the operation key.
- 7) If the level measured in step 5) above is high, change the data so as to reduce it with the operation key, but if the level is low, change the data to increase it.
- 8) Repeat the steps 1) to 7) so as to get playback video signal level of 2.0Vp-p on TP1402.

10. Adjustment of YFM deviation (Hi-8)

| | |
|----------------------|----------------------|
| Measuring instrument | Oscilloscope |
| Mode | VCR REC/PB |
| Input signal | Color bar (Figure A) |
| Measuring point | TP1401 |
| Adjustment address | 0C |
| Set point | 2.0 ± 0.1 Vp-p |

- 1) The procedure is the same as stated in item 10 above. Adjustment in Hi-mode is performed with the aid of Hi-8 tape.

11. Adjustment of Y record current (normal)

| | |
|----------------------|---|
| Measuring instrument | Oscilloscope |
| Mode | VCR STOP |
| Input signal | Color bar (Figure A) |
| Measuring point | TEST 2 connector SC35
(1) and (16) pins |
| Adjustment address | 0F |
| Set point | $Y_a \pm 10\text{mVp-p}$
(refer to the description below.) |

- 1) Cancel the VTR adjustment mode with the adjusting jig, and set the input mode on the menu screen.
- 2) Input the color bar signal from the video input/output terminal.
- 3) Set the VTR adjustment mode with the adjusting jig, and set address with the operation key.
- 4) Measure amplitude of sync tip of TEST2 connector (1) pin waveform (Figure 8-3-2), and let the obtained amplitude be A. (When the address is set and data is displayed, waveform is output.)
- 5) Similarly, observe the (16) pin waveform, and measure the amplitude of sync tip. Let the obtained amplitude be B.
- 6) Calculate value, using the following formula.

$$Y_a = \frac{A}{A-B} \times 220 [\text{mVp-p}]$$
- 7) Observe the TEST2 connector (1) pin, and set data with the operation key so that the amplitude of sync tip becomes equal to the Y_a value calculated in step 6) above.
- 8) Ascertain that the difference of amplitudes of (1) and (2) pins is 220mVp-p.

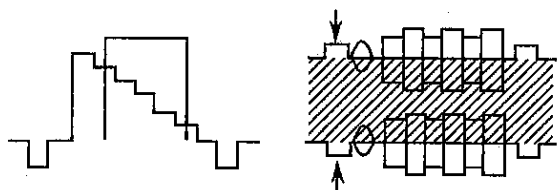


Figure 8-4-2.

12. Adjustment of Y record current (Hi-8)

| | |
|----------------------|----------------------------------|
| Measuring instrument | Oscilloscope |
| Mode | VCR STOP |
| Input signal | Color bar (Figure A) |
| Measuring point | TEST 2 connector SC35
(1) pin |
| Adjustment address | 10 |
| Set point | $Y_b \pm 10\text{mVp-p}$ |

- 1) The same as stated in items 12-1), 1), 2), and 3)

- 2) Calculate value, using the following formula. A and B are values measured in item 12 above.

$$Y_b = \frac{A}{A-B} \times 200 [\text{mVp-p}]$$

- 3) Observe the TEST2 connector (1) pin, and set data with the operation key so that the amplitude of sync tip becomes equal to the Y_b value calculated in step 2) above.
- 4) Ascertain that the difference of amplitudes of (1) and (2) pins is 200mVp-p.

13. Adjustment of C record current

| | |
|----------------------|-----------------------------------|
| Measuring instrument | Oscilloscope |
| Mode | VCR STOP |
| Input signal | Color bar (Figure A) |
| Measuring point | TEST 2 connector SC35
(1) pins |
| Adjustment address | 0D |
| Set point | $C_a \pm 3\text{mVp-p}$ |

- 1) The same as stated in items 12-1, 2), and 3)
- 2) Calculate value, using the following formula. A and B are values measured in item 12 above.

$$C_a = \frac{A}{A-B} \times 35 [\text{mVp-p}]$$
- 3) Observe the TEST connector (1) pin, and set data with the operation key so that the amplitude of red part of waveform becomes equal to C_a value.
- 4) Ascertain that the difference of amplitudes of (1) and (2) pins is equal to 35mVp-p.

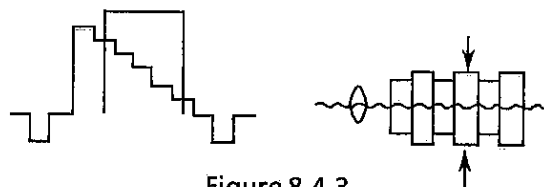


Figure 8-4-3

For VL-H400S/H, take the following procedure after Y/C circuit adjustment. (Note: Be sure to take the procedure for VL-H400S/H; but it is unnecessary for VL-H400X/H9E.)

- 1) Set the unit to VTR adjustment mode by using adjustment jig.

Then set the following addresses and data by operation switch.

| address | data |
|---------|------|
| 72 | 02 |
| 73 | FD |

- 2) Remove the battery or disconnect the AC adaptor once, and then set them again. (Check that the lithium battery has been removed then.)

Finally, cancel the VTR adjustment mode of adjusting jig.

8-5. AUDIO CIRCUIT ADJUSTMENT

Note: The data enclosed between brackets [] is for sub-CH.

1. "fo" adjustment

| | |
|----------------------|-------------------|
| Measuring instrument | Digital voltmeter |
| Mode | Camera EE |
| Input signal | |
| Measuring point | TP610 [TP609] |
| Adjustment address | 1A[1B] |
| Set value | $2.05 \pm 0.20V$ |

- 1) Connect the digital voltmeter to TP610 [TP609], and make an adjustment so as to get an indication of $2.05 \pm 0.20V$.

Notes: Since voltage response of measuring point is slow during adjustment, it takes longer time to stabilize the indication (usually 5 to 6 seconds).

2. Adjustment of playback level

| | |
|----------------------|------------------|
| Measuring instrument | Valve voltmeter |
| Mode | Playback |
| Input signal | |
| Measuring point | TP616[TP613] |
| Adjustment address | 1C[1D] |
| Set value | $-8dB \pm 0.5dB$ |

- 1) Before adjusting set the data of adjustment address:1E to 00. Record in advance the data which has been set previously and exists currently at the address :1E.
- 2) Connect the valve voltmeter to TP616[TP613].
- 3) Play back the stereo standard tape (JiGWR5-9CS), and make an adjustment so as to get an indication of $-8dB \pm 0.5dB$.
- 4) After completion of adjustment of main CH and sub-CH return the initially stored data to the adjustment address:1E.
After adjustment of playback level it is necessary to perform the following playback matrix adjustment in succession.

3. Adjustment of playback matrix

| | |
|----------------------|---------------------------|
| Measuring instrument | Oscilloscope |
| Mode | Playback |
| Input signal | |
| Measuring point | TP616 |
| Adjustment address | 1E |
| Set value | Minimum (1 kHz component) |

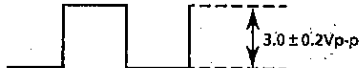
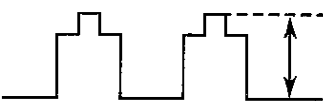
- 1) Connect the oscilloscope to TP616.
- 2) Observing the oscilloscope, play back the stereo standard tape (JiGWR5-9CS), and make an adjustment so that 1 kHz component becomes minimum and 400 Hz component remains.

Reference

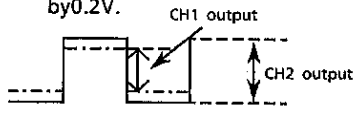
If the valve voltmeter is not available for playback level adjustment, it is possible to set to $873 \text{ mVp-p} \pm 50 \text{ mV}$ with the oscilloscope.

8-6. LCD DISPLAY CIRCUIT ADJUSTMENT

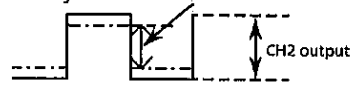
1. CONTRAST ADJUSTMENT

| | |
|---------------------|---|
| Measuring place | TP803 |
| Address | 14 |
| Mode | VTR
Printer input
EE mode |
| Adjusting method | <p>(1) Set the bright level at the address 21.
(Printer noninput signal)</p>  <p>(2) Input white 100% signal as input.</p> <p>(3) Disconnect FPC of LCD panel from the connector (SC46).</p> <p>(4) Connect TP837 to GND.
(1H inversion stop)</p> <p>(5) Adjust output waveform of TP803(G output) between pedestal and SYNC tip.</p>  |
| Adjustment standard | $3.0 \pm 0.2V_{p-p}$ |
| Remarks | TP803 output impedance, less than 100 ohm |

2. Red/white balance adjustment

| | |
|---------------------|--|
| Measuring place | TP803, TP804 |
| Address | 15 |
| Mode | VTR
Printer input
EE mode |
| Adjusting method | <p>(1) Set the Printer input to "nonsignal".</p> <p>(2) TP803(G output): Oscilloscope CH1
TP804(R output): Oscilloscope CH2</p> <p>(3) Set the interval of the pedestals of CH2 larger than that of CH1 by 0.2V.</p>  |
| Adjustment standard | R output (CH2) $\pm 0.1V$ |
| Remarks | |

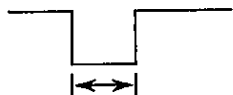
3. Blue/white balance adjustment

| | |
|---------------------|--|
| Measuring place | TP802, TP803 |
| Address | 16 |
| Mode | VTR
Printer input
EE mode |
| Adjusting method | <p>(1) Set the Printer input to "nonsignal".</p> <p>(2) TP803(G output): Oscilloscope CH1
TP802(B output): Oscilloscope CH2</p> <p>(3) Set the interval of the pedestals of CH2 larger than that of CH1 by 0.1V.</p>  |
| Adjustment standard | B output (CH2) $\pm 0.1V$ |
| Remarks | |

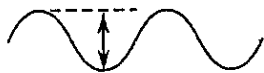
4. VCO fo adjustment

| | |
|---------------------|--|
| Measuring place | TP807 |
| Address | 17 |
| Mode | VTR
Printer input
EE mode |
| Adjusting method | <p>(1) Set the Printer input to "nonsignal".</p> <p>(2) Connect the frequency counter to TP807, and set frequency.</p> |
| Adjustment standard | $15.625kHz \pm 100Hz$ |
| Remarks | |

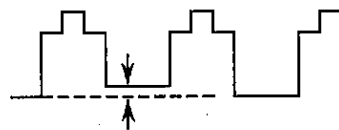
5. Horizontal position adjustment

| | |
|---------------------|--|
| Measuring place | TP807 |
| Address | 18 |
| Mode | VTR
Printer input
EE mode |
| Adjusting method | (1) Input white 100% signal as Printer input.
(2) TP807(HD pulse): oscilloscope
(3) Set the HD pulse width.
 |
| Adjustment standard | $5.5 \pm 0.3 \mu\text{sec}$ |
| Remarks | _____ |

6. Common bias adjustment

| | |
|---------------------|--|
| Measuring place | LCD panel display |
| Address | 19 |
| Mode | VTR
Printer input
EE mode |
| Adjusting method | (1) Set the bright level (address 21) 7F with the printer input nonsignal.
(2) Input the white 40% signal to the printer input.
(3) Fix the illuminometer on the panel (prevent influence of ambient light).
(4) Connect the analog output of illuminometer to the oscilloscope.
(5) Make an adjustment so as to minimize the output waveform ripple.

Response Time: 0.6 sec
* Or set to the point where black (gray scale signal) attains the highest blackness. |
| Adjustment standard | Minimum |
| Remarks | Do adjustment after aging for about 1 minute (so as to stabilize luminance of backlight). At this time keep the backlight in "Normal" mode. |

7. Burst phase adjustment

| | |
|---------------------|--|
| Measuring place | TP802 |
| Address | 23 |
| Mode | VTR
Printer input
EE mode |
| Adjusting method | (1) Input the monochrome signal (R) to Printer input
(2) TP802 (Boutput): oscilloscope
(3) Connect TP837 to the ground. (Every 1H reverse stops.)
(4) Set the address 22 (color level) data to 55.
(5) Minimize the signal level difference every 1H.

Minimum adjustment |
| Adjustment standard | Minimum |
| Remarks | _____ |

8. Protector circuit operation inspection

| | |
|---------------------|---|
| Measuring place | TL420 |
| Address | _____ |
| Mode | VTR
Printer input
EE mode |
| Adjusting method | (1) Place the resistor 1k Ω to TL842 in series and apply +6.5V and 0V.
(2) Ascertain that the lamp indication is displayed on the LCD screen. |
| Adjustment standard | _____ |
| Remarks | _____ |

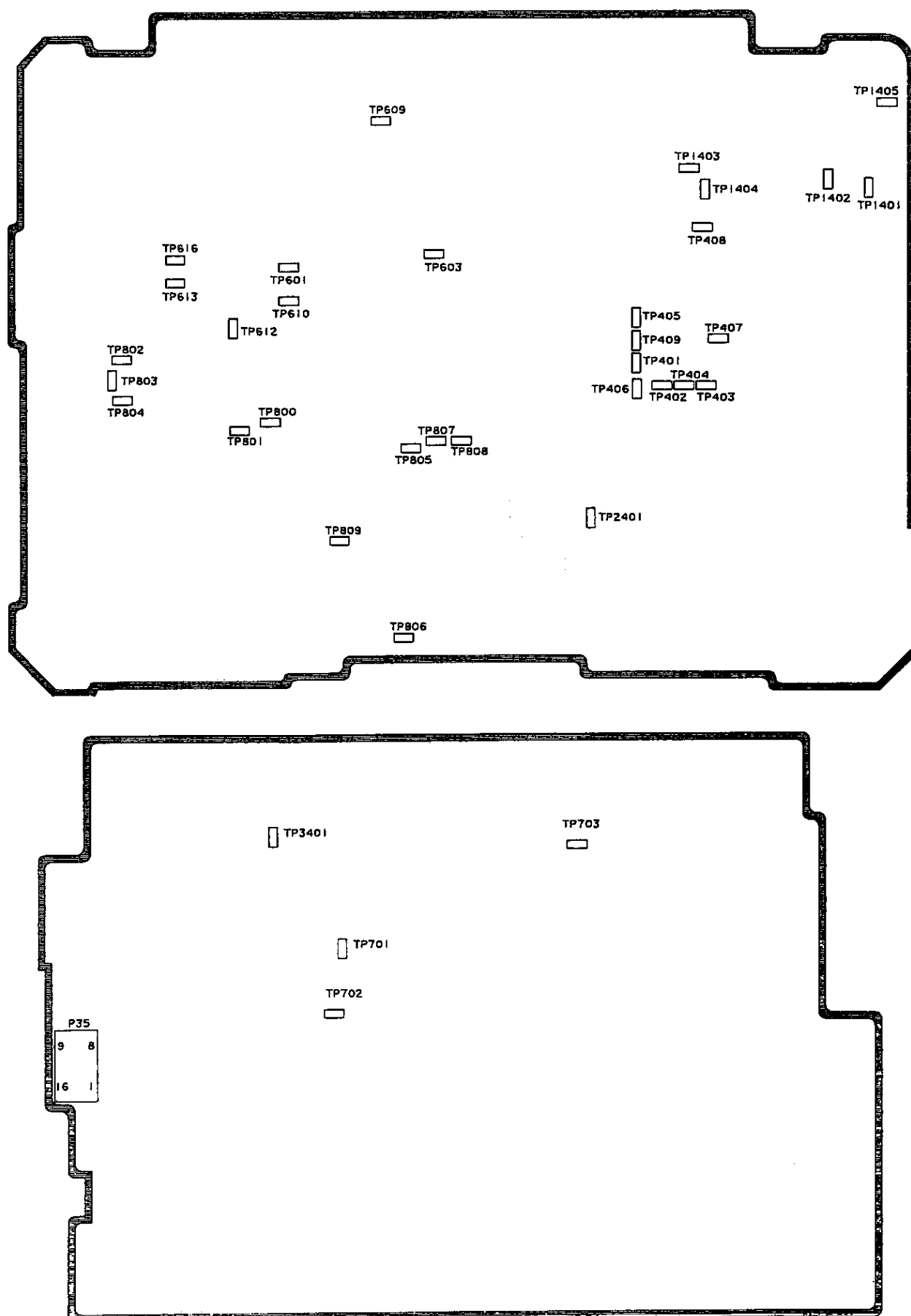
9. Common bias operation inspection

| | |
|---------------------|---|
| Measuring place | _____ |
| Address | _____ |
| Mode | VTR
Printer input
EE mode |
| Adjusting method | (1) Input pan signal (horizontal pan) as Printer input.
(2) Check that the vertical stripes are not remarkable.
(3) If the vertical stripes are remarkable, do gain adjustment of item 6. |
| Adjustment standard | _____ |
| Remarks | _____ |

10. White balance inspection

| | |
|---------------------|---|
| Measuring place | _____ |
| Address | _____ |
| Mode | VTR
Printer input
EE mode |
| Adjusting method | (1) Set VTR white fade.
(2) Make an adjustment so as to get the same white screen as that of monitor (do again adjustment of items 2 and 3). |
| Adjustment standard | _____ |
| Remarks | Do adjustment after aging for about 1 minute (so as to stabilize luminance of backlight). |

8-7. LOCATION OF TEST POINT AND CONTROLS



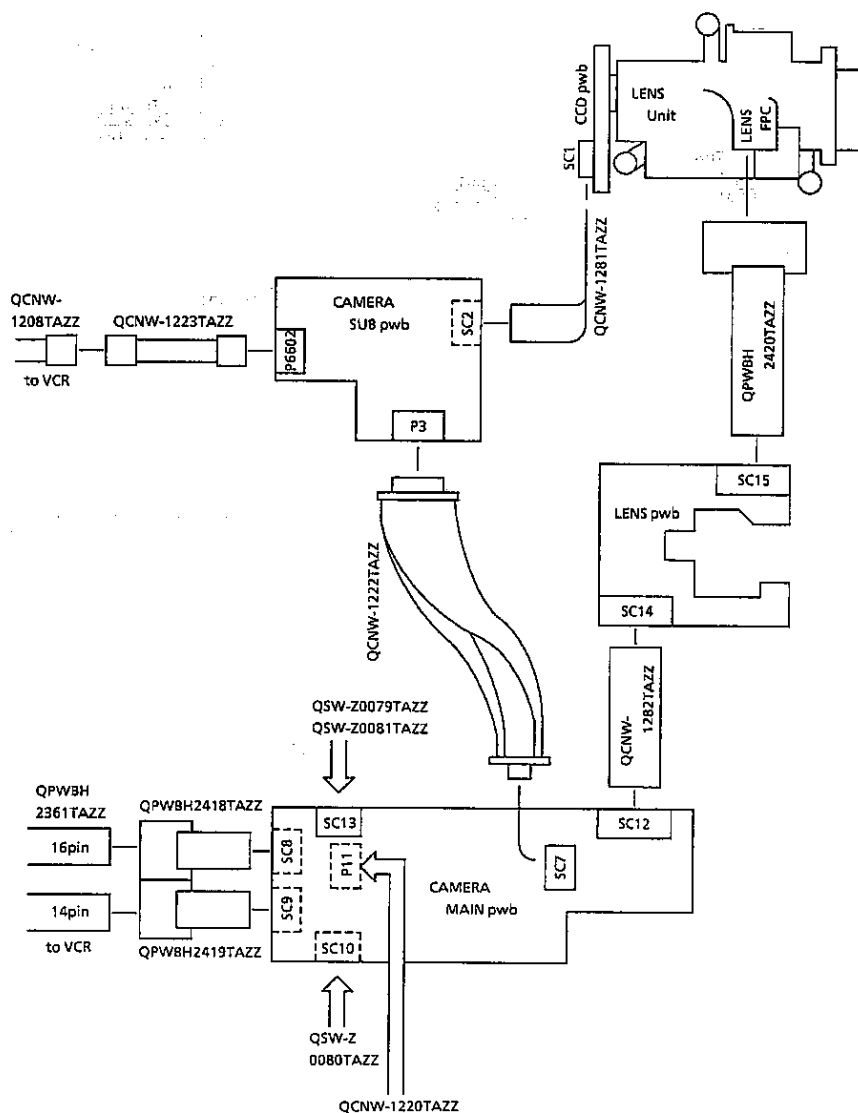
9. ADJUSTMENT OF CAMERA SECTION

9-1. SERVICING OF CAMERA SECTION

(1) Object, measuring instruments and jigs necessary for camera section servicing

- Gray scale chart
- White pattern chart
- Color bar chart
- Oscilloscope
- Digital voltmeter
- Vectorscope
- Halogen light (2 pcs.)
- Frequency counter
- Illuminometer
- Color temperature meter
- Color temperature conversion filter HOYA "LB-165"
- Color video monitor
- Video output cable
- AC adapter
- Tripod fixing jig
- Extension cable
- Adjustment mode setting jig
- Switch jig for adjustment

(2) Standard connection diagram for camera service



(3) Connection for camera adjustment

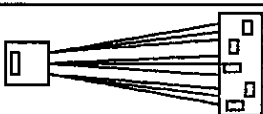
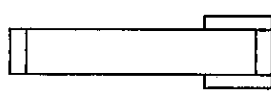
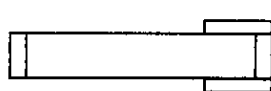
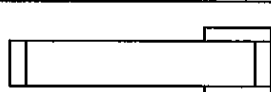
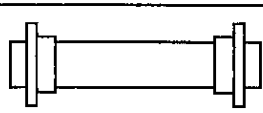
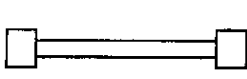
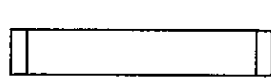
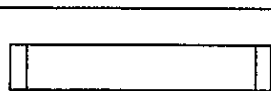
When adjusting the camera, do not use the extension cable provided in the camera section. Otherwise, white balance adjustment or carrier balance adjustment may be disturbed.

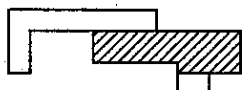
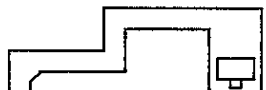
The application of extension cable for connection between camera and VCR causes no problem.

Applicable extension cables: QPNBH2418TAZZ
QPNBH2419TAZZ
QCNW-1223TAZZ

9-2. LIST OF CAMERA JIGS AND TOOLS

Note: N indicates the new jigs.

| No. | Jig Name | Parts Code | Price Code | Shape | Remarks |
|-----|---|---|------------|---|-------------|
| 1 | Camera section jig stand | 9ERJIGSTANDHL2 | CG |  | N |
| 2 | Gray scale chart (390 × 520 mm) | JIGCHART-1 | CP |  | |
| 3 | White pattern chart (390 × 520 mm) | JIGCHART-2 | CG |  | |
| 4 | Color bar chart (240 × 320 mm) | JIGCHART-4 | ※※ |  | |
| 5 | Illuminometer (0 to 3,000 lux) | JIGMETER-1 | CT |  | |
| 6 | Color thermometer (1,600 to 400,000K) | JIGMETER-2 | ※※ |  | |
| 7 | Color temperature conversion filter (from 3,200K to 6,800K) | JIGHOYA-LB165 | BL | | |
| 8 | Torque driver (1.5 kg.cm) | JIGTD1500RTDH | CB | | |
| 9 | Camera adjusting switch jig (P11 ADJ connector) | QCNW-1220TAZZ | BD |  | N |
| 10 | Adjustment mode setting jig (Test P35 connector) | QPWBN2408TAZZ
or
QPWBF2450TAZZ
QCNW-1292TAZZ | BY
BF |  | N
N
N |
| 11 | Extension flexible PWB
Camera main PWB (SC8) ↔ video FPC | QPWBH2418TAZZ | AY |  | N |
| 12 | Extension flexible PWB
(Camera main PWB ↔ video FPC)
(SC9) | QPWBH2419TAZZ | AY |  | N |
| 13 | Extension flexible PWB
(Camera main PWB (SC12) ↔ lens
PWB(SC14)) | QPWBH2420TAZZ | BA |  | N |
| 14 | Extension cable wire
(Camera main PWB ↔ Camera sub
PWB)(SC7 connector ↔ P3 connector) | QCNW-1222TAZZ | BF |  | N |
| 15 | Extension cable wire
(Camera sub PWB ↔ audio cable)
(P6602 connector) | QCNW-1223TAZZ | AM |  | N |
| 16 | Extension flat cable
CCD PWB (SC1) ↔ Camera sub PWB
(SC2) | QCNW-1281TAZZ | AG |  | N |
| 17 | Extension flat cable
Camera main PWB (SC12) ↔ Lens PWB
(SC14) | QCNW-1282TAZZ | AH |  | N |

| No. | Jig Name | Parts Code | Price Code | Shape | Remarks |
|-----|--|--|------------|---|---------|
| 18 | Camera operation SW unit
Camera main PWB (SC13) | QSW-Z0079TAZZ | AG |  | N |
| 19 | Power control SW unit
Camera main PWB (SC10) | QSW-Z0080TAZZ | AP |  | N |
| 20 | Zoom SW unit
4-pin connector in camera operation
SW unit | QSW-Z0081TAZZ
(The domestic model is
Z0084TAZZ.) | AS |  | N |
| 21 | FPC Insert Jig | 9EQPINSET01GE | BG |  | |

(1) Tripod fixing stand

When mounting the camera section on the tripod, use the stand (9ERJIFSTANDHL2). Attach it to the camera section lens holder as shown in Figure 9-2.

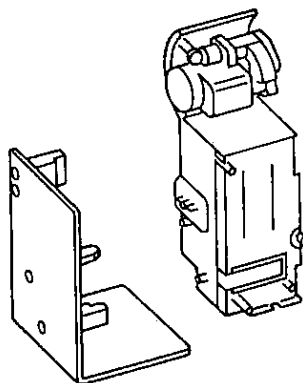


Figure 9-2

(2) Camera section adjusting switch jig (QCNW-1220TAZZ)

The jig QCNW-1220TAZZ is provided with waveform monitoring test point for camera adjustment and switches for camera signal adjustment and zoom lens system auto-focus adjustment (detailed explanation is given later).

When this jig is used, voltage applied to some test points may differ from the indicated one, but this is not trouble.

CAM4.4V TP: Actually, approx. 3.3V is applied.

-13V TP: Actually, approx. -16V is applied.

The usage of this jig is explained later.

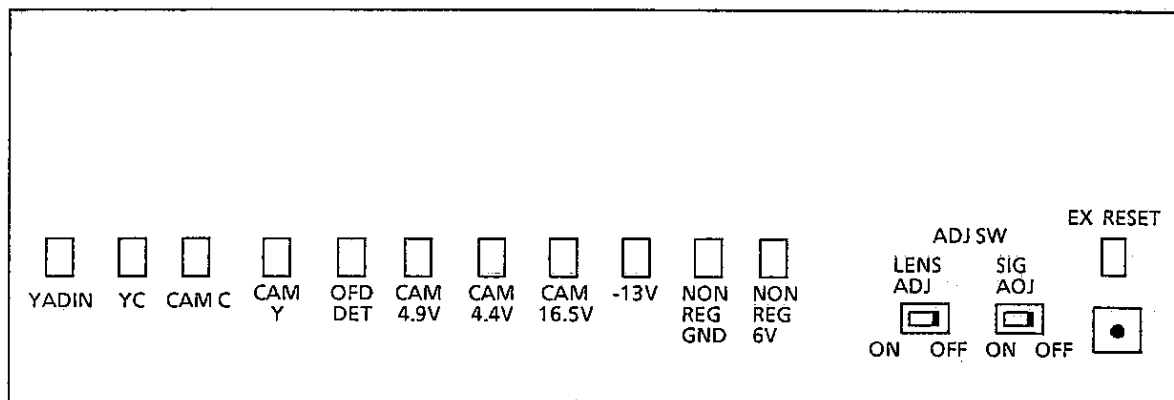


Figure 9-3

(3) Adjustment mode setting jig (QPWBN2408TAZZ or QPWBF2450TAZZ, QCNW-1292TAZZ)

The jig QPWBN2408TAZZ is designated to set the system microcomputer to the camera adjustment mode. In the camera adjustment mode the signal system of camera section can be adjusted by using the FF or REW key of VTR control section as adjustment of VCR and LCD circuit.

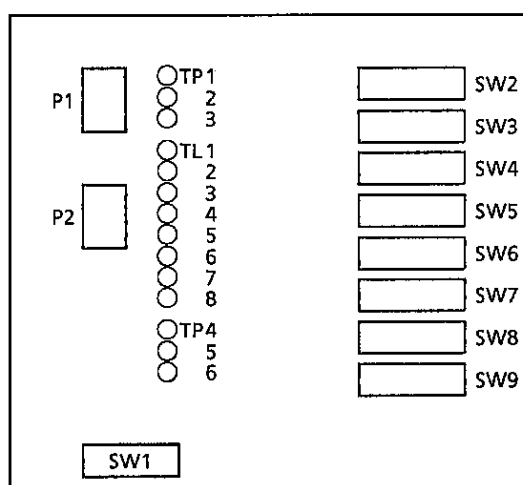
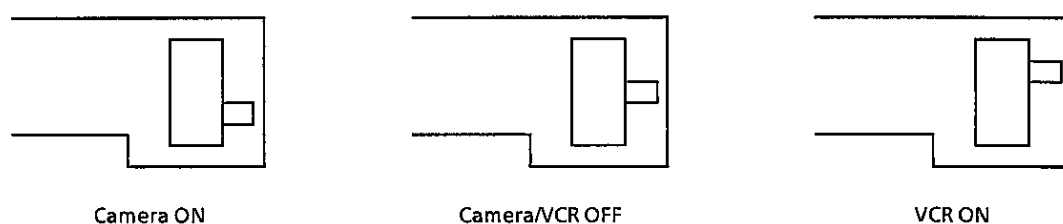


Figure 9-4

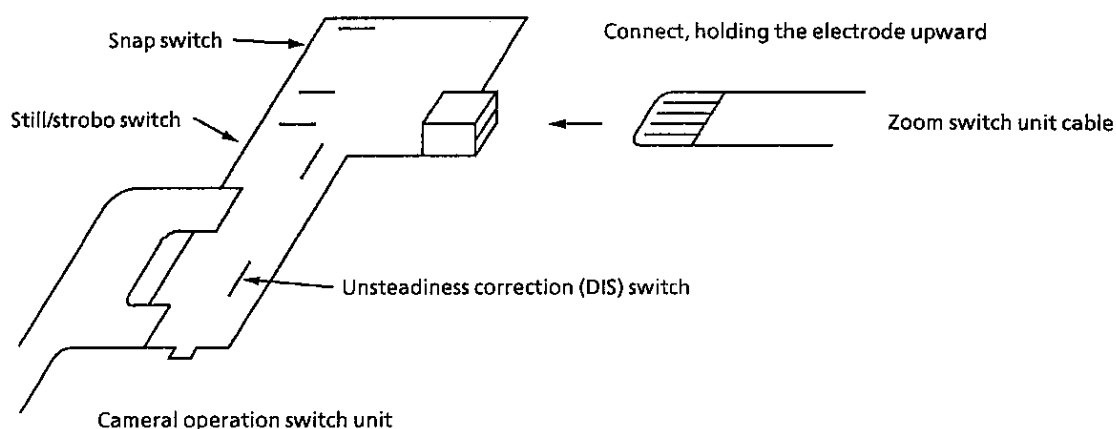
(4) Power control SW unit (QSW-Z0080TAZZ)

A slide switch is provided at the front end of unit QSW-Z0080TAZZ. To actuate the camera section, use this slide switch.



(5) Camera operation switch unit (QSW-Z0079TAZZ) and zoom switch unit (QSW-Z0081TAZZ)

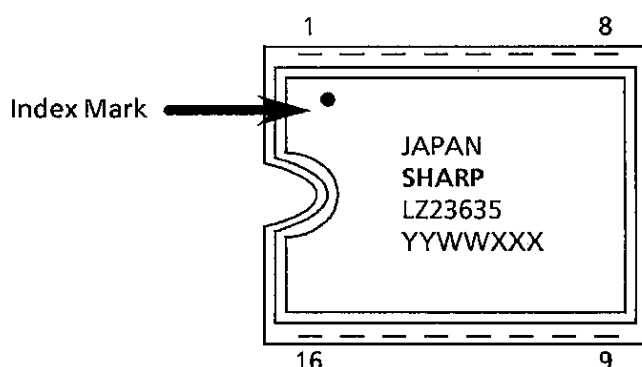
The unit QSW-Z0079TAZZ and unit QSW-Z0081TAZZ are used for camera section still, snap operation, and lens zoom operation. The zoom switch unit is connected to the 4-pin connector in the camera operation switch unit.



9-3. REPLACEMENT OF CCD SENSOR

- Before replacement

- 1) The CCD image sensor is more sensitive to electrostatic breakage than C-MOS LSI. Therefore sufficient means to prevent electrostatic damage must be taken when it is replaced.
 - Ground the soldering iron.
 - Ground also the human body, using the wrist strap (through an 1 Mohm resistor).
 - Until the CCD sensor is mounted on the PWB, fit it to the conductive sponge, and short-circuit the foot lead.
- 2) Take utmost care so that the surface glass of CCD sensor and optical filter are not contaminated and damaged. If any contamination is found, for example fingerprint, wipe it off with silicon paper or clean chamois skin.
- 3) When replacing the CCD sensor, use the antistatic grounded soldering iron, and perform quickly soldering.
- 4) Before mounting the CCD sensor, read the V-OFD voltage shown on the rear side of CCD sensor, and record it. When adjusting V-OFD voltage, refer to the item 2 of "Adjustment Procedure".



V-OFD voltage shown on the rear side of CCD sensor

Figure 8-5

- Removal of CCD

1. Unsolder the CCD sensor leads from the sensor PWB.
2. Remove the screw (1) to take out the sensor PWB.
3. Remove the two screws (2), and remove the sensor holder and CCD sensor.

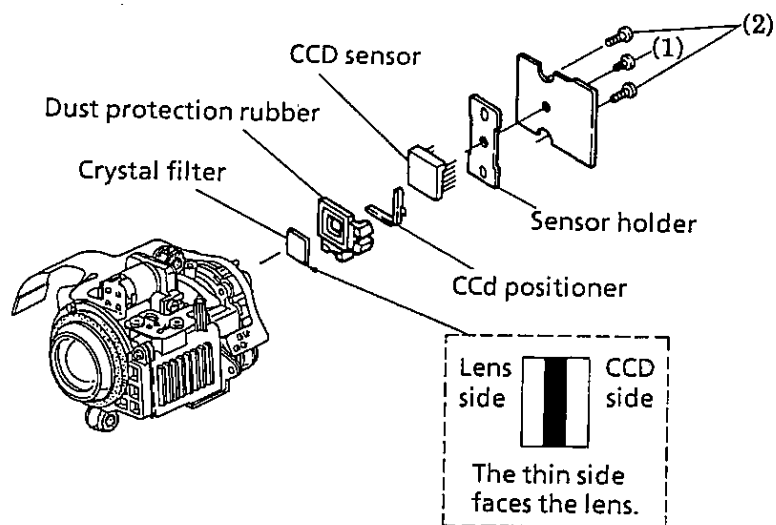
- Mounting of CCD

1. Place the lens unit upright (since the CCD sensor mount ID faces upward, care must be taken so as not to damage the front lens of lens unit), put the crystal filter first and then the dust protection rubber into the CCD holder of lens unit. Set the crystal unit with its thin side toward the lens unit.
2. Fit the CCD positioner inside the right and lower protrusions of dust protection rubber.
3. Place the CCD sensor so that the its No. 1 pin is at the upper left side (semicircular notch of side surface is at left side), and put the CCD sensor into the CCD holder. For smooth and tight fitting, press the right lower part of back of CCD sensor, and then press the left upper part.

Note: Pay attention to the direction of CCD sensor.

4. Place the sensor holder so that its two round markings be visible, and fix the sensor holder with the two screws (2).
5. Mount the sensor PWB so that the CCD sensor leads go thorough the PWB holes. Fix the PWB with the screw (1).
6. Solder the CCD sensor lead to the sensor PWB.

Note: Take care not to apply excessive heat.



9-4. ADJUSTMENT OF CAMERA SECTION

- (1) Preparation and check before adjustment
 - 1) Adjust the illumination to get an illuminance of about 3,000 lux and to ensure uniform illuminance on whole pattern surface (it is desirable to use two or more lights).

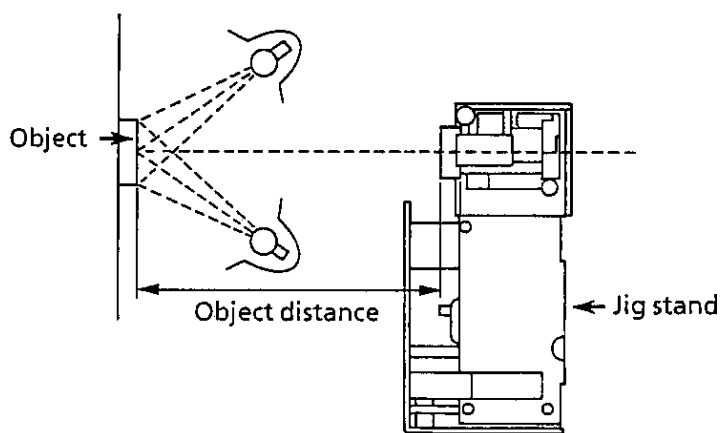


Figure 9-7

- 2) Use the clean test pattern free from discoloration.
- 3) If any trouble occurs in the electric circuit, be sure to find the defective part with the aid of measuring instrument, and repair or replace it before making an adjustment.

- (2) The microcomputer is used for adjustment of camera signal system and auto-focus of zoom lens. The jig QPWB2408TAZZ (Figure 9-6) is connected to P35 of VCR main PWB. The pertinent adjustment mode can be set with the pertinent switch.

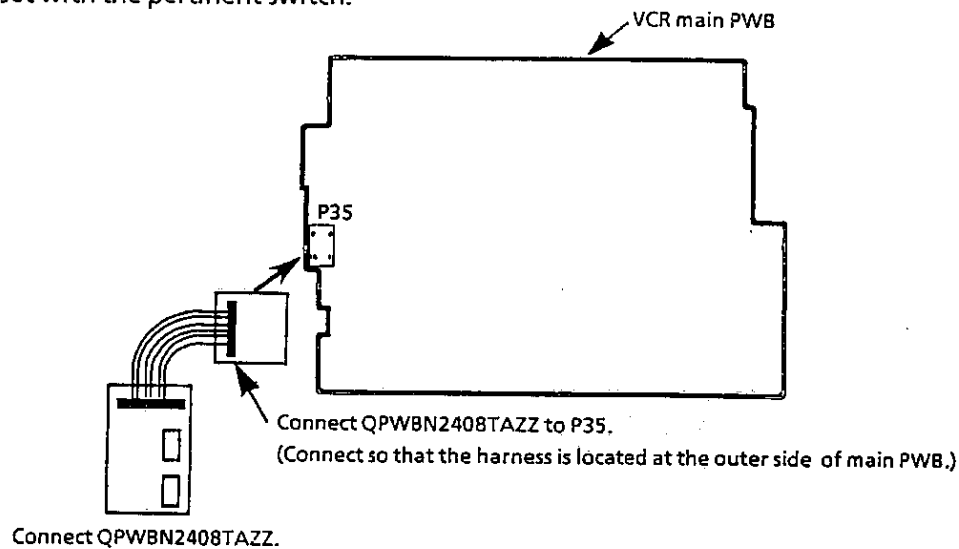
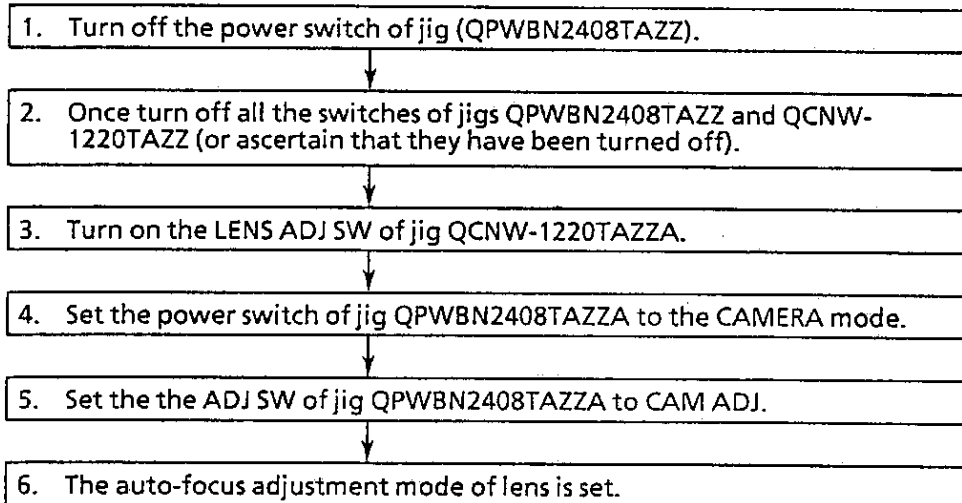


Figure 9-8

(2)-1 Method of changing the mode to the zoom lens auto-focus adjustment mode



- * After the auto-focus adjustment mode has been set, make an adjustment according to the adjustment procedure stated in item 3.
- * In the auto-focus adjustment mode the lens operation is disabled.
- The unit employs the microcomputer-controlled auto-focus lens. The auto-focus circuit of the unit adopts the picture processing system which is designed to perform focusing, using the effect that the high frequency component in the picture signal increases as the focusing becomes better. Moreover, so as to attain higher magnifying power with the small lens the unit employs the inner focus system which is designed to adjust the focus by moving the master lens (rear lens) forward and backward. The inner focus system ensures the full range focus from about 10 mm to infinite distance. However, the shortest distance of object at the TELE end is 1.5 m. Therefore, if the object at a distance of less than 1.5 m is shot at the TELE end, focusing is impossible. Hence, the zoom is shifted automatically to the WIDE end to the position where the focusing is obtained.

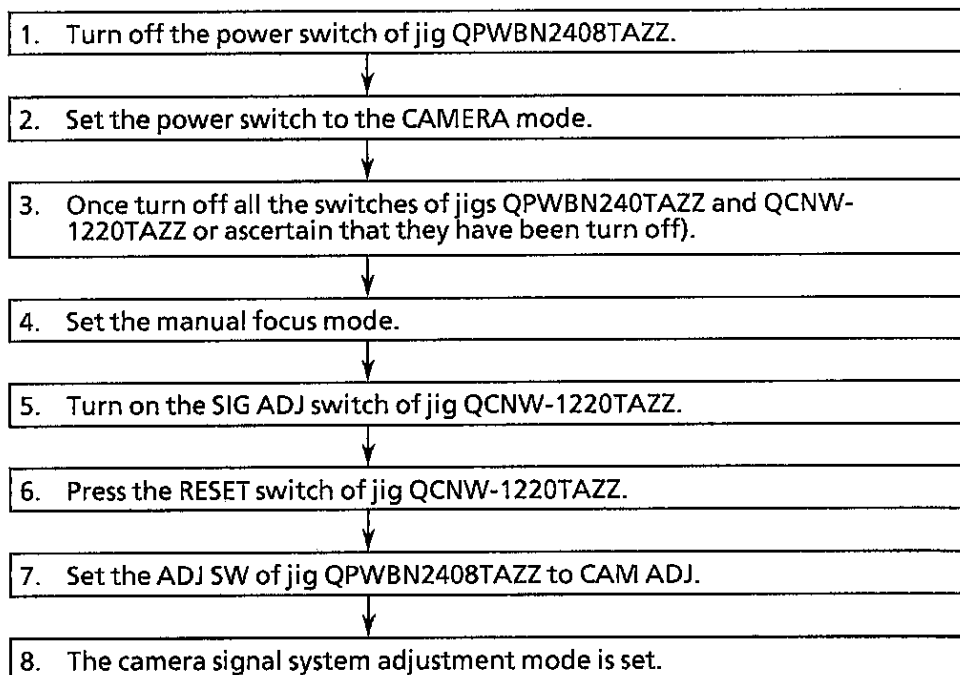
The important factors of the auto-focus system adopted in the unit are:

- 1) Detection of reference position of master lens
- 2) Detection of position of iris
- 3) Detection of reference position of zoom lens

These detection data are stored in the EEPROM (IC502) by microcomputer for each lens. Accordingly, the auto-focus adjustment must be performed in the following cases.

- 1) After replacement of lens
- 2) After replacement of CCD
- 3) After replacement of E2PROM (IC502)

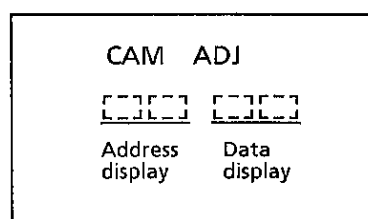
(2)-2 Method of changing the mode to camera signal system adjustment mode



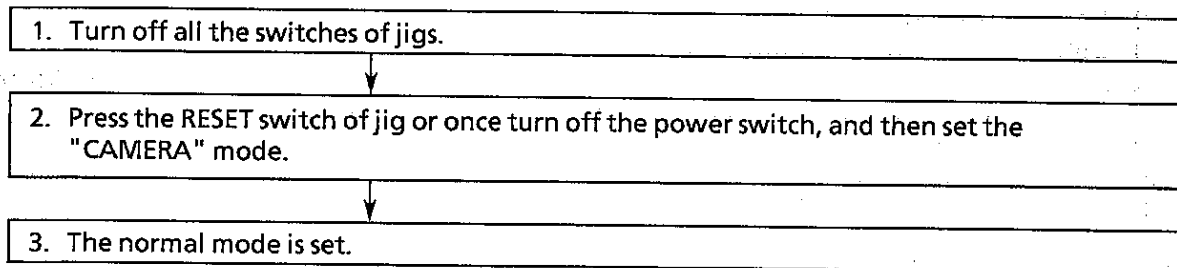
* The adjustment characters appear and "00" blinks on the left upper part of monitor screen (or LCD screen) (see the figure below).

The white balance is fixed to the indoor mode (3200K). Thereby adjustment of signal system is enabled.

Initial screen after camera signal system adjustment mode has been set
([] indicates blanking)



(2)-3 Method of changing to the normal mode



- * The operation for adjustment (method of setting the address and data in EEPROM) is described in 8-1-1 OPERATION PROCEDURE. The camera section can be adjusted by the same adjusting method and operation as those applied for the VCR and LCD circuit.
- * So as to prevent the overwriting of data which do not need adjustment, transcribe the data stored before shipping into the data sheet shown below before starting the adjustment.

CAMERA SECTION ADJUSTMENT DATA SHEET

Date _____

Serial No. _____

| Item | Address | A. | B. |
|---------------|---------|----|----|
| OFD-H | 7B | | |
| OFD-L | 7C | | |
| IRIS AE | F6 | | |
| AGC AE | F7 | | |
| Y-GAIN | 79 | | |
| BURST | 59 | | |
| INDOOR W/B R | 50 | | |
| INDOOR W/B B | 51 | | |
| INDOOR C/B | 78 | | |
| R-Y GAIN | 53 | | |
| B-Y GAIN | 54 | | |
| R-Y MAT | 56 | | |
| B-Y MAT | 57 | | |
| OUTDOOR W/B R | 4F | | |
| OUTDOOR W/B B | 55 | | |
| OUTDOOR C/B | 7F | | |

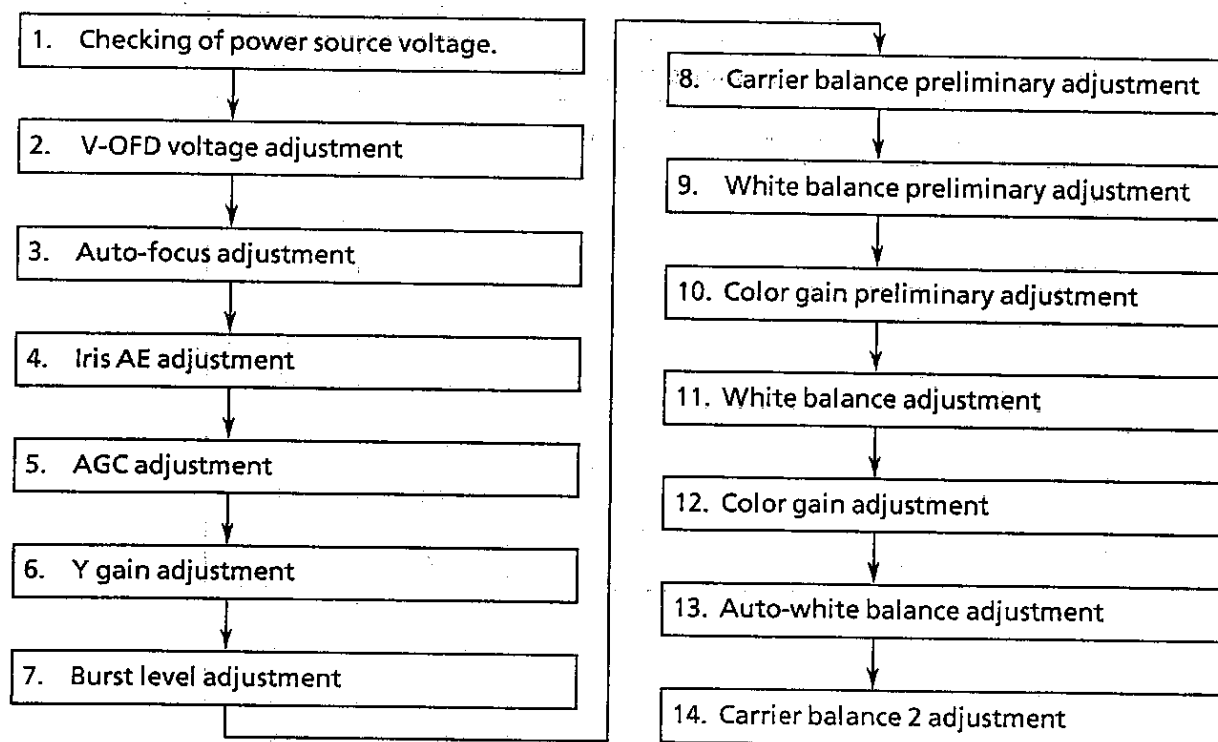
- * After the EEPROM (IC502) is replaced, the preset data which has been set before shipping must be set again. Write the data shown below in the EEPROM.

| Item | Address | Data |
|---|---------|------|
| Low illuminance color suppression start point | 3C | F0 |
| Low illuminance color suppression end point | 3D | FE |
| Color suppression min. level | 3E | 2A |
| Aperture color suppression level | 5B | A4 |
| DSP mode control 3 | 5E | 20 |
| A/F operation type selection flag | AC | 80 |
| Zoom SW TELE 1 | B8 | 1A |
| Zoom SW TELE 2 | B9 | 2E |
| Zoom SW TELE 3 | BA | 38 |
| Zoom SW TELE 4 | BB | 4C |
| Zoom SW WIDE 4 | BC | 93 |
| Zoom SW WIDE 3 | BD | A7 |
| Zoom SW WIDE 2 | BE | B1 |
| Zoom SW WIDE 1 | BF | C5 |
| AE feedback gain parameter | DB | 1C |
| Aperture gain | 0C | 04 |
| W/B high color temperature correction B | 2C | 01 |

- * The data of address '80' to '97' and 'EE' to 'F2' are input adjustment result of zoom lens.
- * The data of address '73' and '74' are input adjustment result of AE system.
- * The data of other addresses are 'FF'.

(3) Camera adjustment procedure

Below is shown the general camera adjustment procedure. In some case some steps may not be necessary.

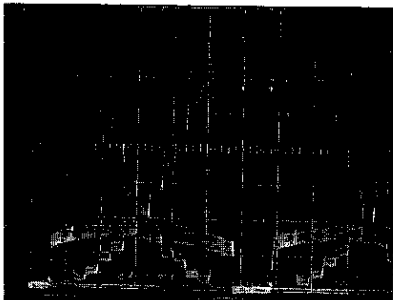
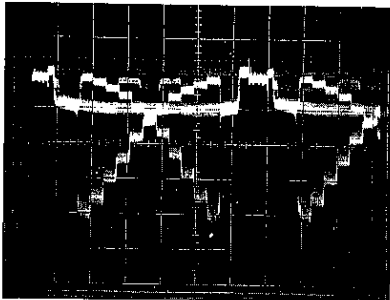
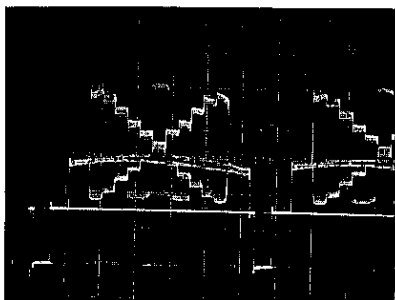


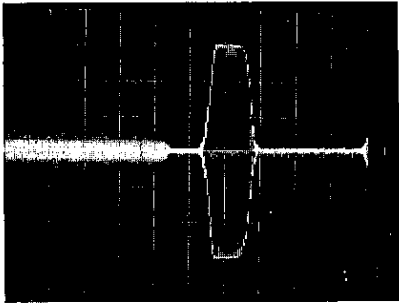
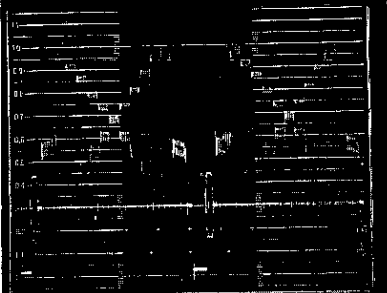
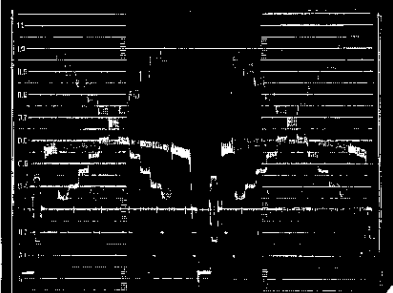
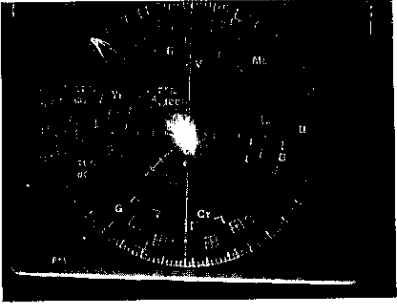
9-5. ADJUSTMENT PROCEDURE

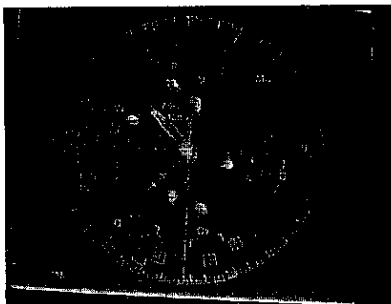
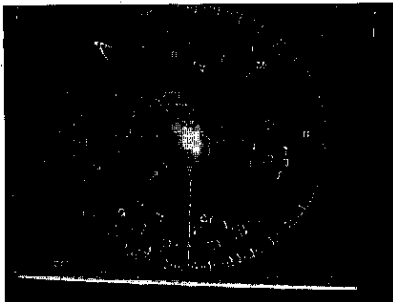
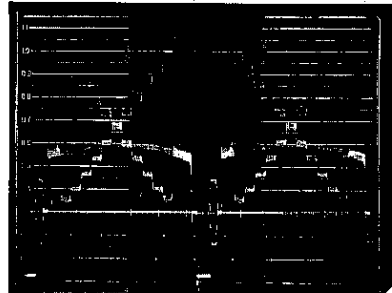
| Item | Adjusting method | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|------|-----------------|----|----|---|----|----|------------------------|--|----|--------------------------------------|--|----|-------------------------------------|--|----|--------------------------------------|--|----|--------------------------------------|
| 1. Power voltage check
● Measuring terminal
: P11(6) (7) (3.3V)
: P11 (8) (4.9V)
: P11 (23) (16.5V)
: P11 (24) (-13V)
: P11 (26) (6V)
● Measuring instrument
: Digital voltmeter | ● Fit the camera adjusting jig to the P11 connector of camera main PWB, and check the following voltage.
P11 (6) (7) 3.3 ± 0.1V
P11 (8) 4.9V ± 0.05V
P11 (23) 16.5V ± 0.1V
P11 (24) -16 ± 1V
P11 (26) 6V (NONREG 5.3 - 7V) | | | | | | | | | | | | | | | | | | | | | |
| 2. V-OFD voltage adjustment

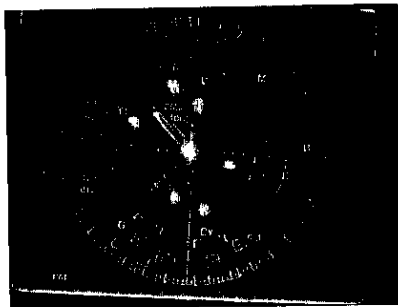
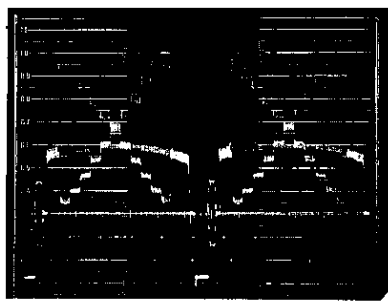
Caution: | <div>This adjustment is performed for each CCD Sensor. Accordingly, make this adjustment only when the CCD sensor is replaced. Read the indicated value of OFD voltage shown at the rear side of CCD sensor, install the sensor PWB on the CCD sensor, and then make adjustment according to the following procedure.</div> | | | | | | | | | | | | | | | | | | | | | |
| ● Measuring terminal
: P11 (9) OFD
● Address : "7B" OFD H
: "7C" OFD L
● Measuring instrument
: Digital voltmeter | ● observe the OFD voltage with the aid of digital voltmeter, make preliminary adjustment at the address "7B", and make adjustment so as to <u>get specified voltage of CCD sensor ± 0.1V at "7C"</u> . | | | | | | | | | | | | | | | | | | | | | |
| 3. Auto-focus adjustment
Set the auto-focus adjustment mode, and write successively the data in the address 'FE' and 'FF', so that adjustment is executed automatically. The adjustment items are as shown in the table below.
If the adjustment has been performed normally, the data 'FF' is written. It is possible to ascertain the normal adjustment by using the VCR operation keys, namely STOP key and PLAY key. Ascertain that the adjustment has been made normally before proceeding to the next adjustment. | | | | | | | | | | | | | | | | | | | | | | |
| <table><tr><th>Address</th><th>Data</th><th>Adjustment Item</th></tr><tr><td>FE</td><td>01</td><td>AE basic adjustment (Hall element adjustment)</td></tr><tr><td>FF</td><td>01</td><td>AF noise level storage</td></tr><tr><td></td><td>02</td><td>Focus shield plate length adjustment</td></tr><tr><td></td><td>03</td><td>Zoom shield plate length adjustment</td></tr><tr><td></td><td>05</td><td>WIDE end focus ∞ position adjustment</td></tr><tr><td></td><td>07</td><td>TELE end focus ∞ position adjustment</td></tr></table> | | Address | Data | Adjustment Item | FE | 01 | AE basic adjustment (Hall element adjustment) | FF | 01 | AF noise level storage | | 02 | Focus shield plate length adjustment | | 03 | Zoom shield plate length adjustment | | 05 | WIDE end focus ∞ position adjustment | | 07 | TELE end focus ∞ position adjustment |
| Address | Data | Adjustment Item | | | | | | | | | | | | | | | | | | | | |
| FE | 01 | AE basic adjustment (Hall element adjustment) | | | | | | | | | | | | | | | | | | | | |
| FF | 01 | AF noise level storage | | | | | | | | | | | | | | | | | | | | |
| | 02 | Focus shield plate length adjustment | | | | | | | | | | | | | | | | | | | | |
| | 03 | Zoom shield plate length adjustment | | | | | | | | | | | | | | | | | | | | |
| | 05 | WIDE end focus ∞ position adjustment | | | | | | | | | | | | | | | | | | | | |
| | 07 | TELE end focus ∞ position adjustment | | | | | | | | | | | | | | | | | | | | |
| Note 1:
The adjustment of ∞ position is executed by actually picking up the image of subject. For this adjustment use the subject with clear profile. Especially, if the adjustment of TELE end focus ∞ position is made without picking up the image of remote subject, adjustment failure may occur.
Adjustment of WIDE end focus ∞ position: 3 m or more
Adjustment of TELE end focus ∞ position: 50 m or more | | | | | | | | | | | | | | | | | | | | | | |
| Note 2:
In case of ∞ position adjustment the field depth is important to ensure the adjustment accuracy. If the field depth is high, the focus becomes too stable, which may cause incorrect adjustment of ∞ position. Therefore the adjustment must be made with low field depth (with iris opened).

The iris can be opened with the high speed shutter. | | | | | | | | | | | | | | | | | | | | | | |
| <ol style="list-style-type: none">1. Turn off the CAM ADJ switch of QPWBN2408TAZZ.2. Use the high speed shutter by ordinary operation until the iris is opened (refer to the Operation Manual).3. Turn on the CAM ADJ switch of QPWBN2408TAZZ.4. Adjust the ∞ position.5. After adjusting the ∞ position return the high speed shutter to the normal state. | | | | | | | | | | | | | | | | | | | | | | |

| Item | Adjusting method |
|--|--|
| <p>4. Iris AE adjustment</p> <p>●Measuring terminal
: P11(2) YADIN</p> <p>●Address : "F6" AE-CVT</p> <p>●Measuring instrument
: Oscilloscope
(horizontal period)</p> <p>●Object : Gray scale</p> | <p>1) Projecting the gray scale in the standard condition, observe (YADIN) with the oscilloscope, and rewrite the data of address "F6" to adjust the amplitude to</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> $720 \pm 20 \text{ mVp-p}$ </div>  |
| <p>5. AGC1 adjustment</p> <p>●Measuring terminal
: P11(3)Yc</p> <p>●Address : "F7" AGC1</p> <p>●Measuring instrument
: Oscilloscope
(horizontal period)</p> <p>●Object : Gray scale</p> | <p>1) Projecting the gray scale in the standard condition, observe (Yc) with the oscilloscope, and rewrite data of address "F7" to adjust the amplitude to</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> $-200 \pm 10 \text{ mVp-p}$ </div>  |
| <p>6. YGAIN adjustment</p> <p>●Measuring terminal
: P11(B)CAM-Y</p> <p>●address : "79" YGAIN</p> <p>●Measuring instrument
: Oscilloscope
(horizontal period)</p> <p>●Object : Gray scale</p> | <p>1) Projecting the gray scale in the standard condition, observe (CAM-Y) with the oscilloscope, and rewrite the data of address "79" to adjust the SYNC level to</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> $300 \pm 10 \text{ mVp-p}$ </div> <p>Note: At this time ascertain that the Y level of CAM-Y is</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> $700 \pm 15 \text{ mVp-p}$ </div> <p>If not, check the data of</p> <ul style="list-style-type: none"> ● address : 13 YENC-STUP : 14 YENC-BLK <p>Ascertain also the adjustment of items 3 and 4.</p>  |

| Item | Adjusting method | | | | |
|--|---|-----|-------------|-----|-------------|
| <p>7. Burst level adjustment</p> <p>●Measuring terminal
: P11(10)CAM-C</p> <p>●Address : "59" BFMX-LEVL</p> <p>●Measuring instrument
: Oscilloscope
(horizontal period)</p> | <p>1) Observe (CAM-C) with the oscilloscope, and rewrite the data of address "59" to set the burst level to 286 ± 20 mVp-p</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;"> 300 ± 20 mVp-p </div> <div style="text-align: center;">  </div> | | | | |
| <p>8. Carrier balance preliminary adjustment</p> <p>●Measuring terminal
: EE output</p> <p>●Address : "78" VRBS1</p> <p>●Measuring instrument
: Waveform monitor</p> | <p>1) Projecting the gray scale in the standard condition, observe the waveform monitor, and make an adjustment so as to minimize color drop-out of black of gray scale 1 gradation.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Improper adjustment</p> </div> <div style="text-align: center;">  <p>Proper adjustment</p> </div> </div> | | | | |
| <p>9. White balance preliminary adjustment</p> <p>●Measuring terminal
: EE output</p> <p>●Address : "50" INDOOR W/B R
: "51" INDOOR W/B B</p> <p>●Measuring instrument
: Vectorscope</p> <p>●Object : Gray scale</p> | <p>1) Projecting the gray scale in the standard condition, observe the vectorscope, rewrite the data of address "50" and "51" to make a setting so that bright spot is located in the position of burst ratio</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 10px auto;"> <table style="margin: 0; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">R-Y</td> <td style="padding: 2px 10px;">$0 \pm 5\%$</td> </tr> <tr> <td style="padding: 2px 10px;">B-Y</td> <td style="padding: 2px 10px;">$0 \pm 5\%$</td> </tr> </table> </div> <div style="text-align: center;">  </div> | R-Y | $0 \pm 5\%$ | B-Y | $0 \pm 5\%$ |
| R-Y | $0 \pm 5\%$ | | | | |
| B-Y | $0 \pm 5\%$ | | | | |

| Item | Adjusting method | | | | | |
|--|--|-----|--------|-----|--------|----------------------|
| <p>10. Color gain preliminary adjustment</p> <p>●Measuring terminal
: EE output</p> <p>●Address : "53" CGIN RYG
: "54" CGIN RYG
: "56" CMAT RYG
: "57" CMAT BYG</p> <p>●Measuring instrument
: Vectorscope</p> <p>●Object : Color bar chart</p> | <p>1) Projecting the color bar in the standard condition, observe the vectorscope, and rewrite the data of address "53", "54", "56", and "57" to make a setting so that the red and blue bright spots are located as follows. (The gain of vectorscope must be set on the point of 75% amplitude on the B-Y axis.)</p>  <p>Red amplitude : 1.35 ± 0.1 times (burst ratio)
Blue amplitude : 0.90 ± 0.1 times (burst ratio)
Red phase : 108* ± 2*
Blue phase : 344* ± 3*</p> | | | | | |
| <p>11. White balance adjustment
Carrier balance 1</p> <p>●Measuring terminal
: EE output</p> <p>●Address : "50" INDOOR W/B R
: "52" INDOOR W/B B
: "78" VRBS 1</p> <p>●Measuring instrument
: Vectorscope
: Waveform monitor</p> <p>●Object : Gray scale</p> | <p>1) Projecting the gray scale in the standard condition, observe the vectorscope, rewrite the data of address "50" and "51" to make a setting so that bright spot is located in the position of burst ratio</p> <table border="1"><tr><td>R-Y</td><td>0 ± 5%</td></tr><tr><td>B-Y</td><td>0 ± 5%</td></tr></table>  <p>2) Observe the waveform monitor in the same projecting condition, rewrite the data of address "78", and make an adjustment so that the color drop-out of gray scale 1 gradation is minimized.</p> <table border="1"><tr><td>0 ± 3% (burst ratio)</td></tr></table>  | R-Y | 0 ± 5% | B-Y | 0 ± 5% | 0 ± 3% (burst ratio) |
| R-Y | 0 ± 5% | | | | | |
| B-Y | 0 ± 5% | | | | | |
| 0 ± 3% (burst ratio) | | | | | | |

| Item | Adjusting method | | | | | | | | | | | | |
|---|---|-------------------------------|---------------|-------------------------------|----------------|--------|-------------------------------|-----------|--------|-----------|------------|--------|-----------|
| <p>12. Color gain adjustment</p> <p>●Measuring terminal
: EE output</p> <p>●Address : "53" CGIN RYG
: "54" CGIN BYG
: "56" CGIN RYG
: "57" CGIN RYG</p> <p>●Measuring instrument
: Vectorscope</p> <p>●Object : Color bar chart</p> | <p>1) Projecting the color bar in the standard condition, observe the vectorscope, rewrite the data of address "53", "54", "56" and "57", and make a setting so that the red and blue bright spot is located in the following position. (The gain of vectorscope must be set on the point of 75% amplitude on the B-Y axis.)</p>  <table><tr><td>Red amplitude</td><td>: 1.35</td><td>± 0.1 times (burst ratio)</td></tr><tr><td>Blue amplitude</td><td>: 0.90</td><td>± 0.1 times (burst ratio)</td></tr><tr><td>Red phase</td><td>: 108*</td><td>$\pm 2^*$</td></tr><tr><td>Blue phase</td><td>: 344*</td><td>$\pm 3^*$</td></tr></table> | Red amplitude | : 1.35 | ± 0.1 times (burst ratio) | Blue amplitude | : 0.90 | ± 0.1 times (burst ratio) | Red phase | : 108* | $\pm 2^*$ | Blue phase | : 344* | $\pm 3^*$ |
| Red amplitude | : 1.35 | ± 0.1 times (burst ratio) | | | | | | | | | | | |
| Blue amplitude | : 0.90 | ± 0.1 times (burst ratio) | | | | | | | | | | | |
| Red phase | : 108* | $\pm 2^*$ | | | | | | | | | | | |
| Blue phase | : 344* | $\pm 3^*$ | | | | | | | | | | | |
| <p>13. Auto-white balance adjustment</p> <p>●Measuring terminal
: EE output</p> <p>●Address : "4F" OUTDOOR R
: "55" OUTDOOR B</p> <p>●Measuring instrument
: Vectorscope</p> <p>●Object : Gray scale</p> | <p>1) Attach the color temperature conversion filter (LB165) to the lens.</p> <p>2) Projecting the gray scale in the standard condition, observe the vectorscope, and make a setting so that the bright spot is located in the position of</p> <table border="1"><tr><td>R-Y</td><td>+ 3 $\pm 5\%$</td></tr><tr><td>B-Y</td><td>- 3 $\pm 5\%$</td></tr></table>  | R-Y | + 3 $\pm 5\%$ | B-Y | - 3 $\pm 5\%$ | | | | | | | | |
| R-Y | + 3 $\pm 5\%$ | | | | | | | | | | | | |
| B-Y | - 3 $\pm 5\%$ | | | | | | | | | | | | |
| <p>14. Carrier balance 2 adjustment</p> <p>●Measuring terminal
: EE output</p> <p>●Address : "7F" VRBS 2</p> <p>●Measuring instrument
: Waveform monitor</p> <p>●Object : Gray scale</p> | <p>1) Observe the waveform monitor in the state described in item 12 above, rewrite the data of address "7F" to minimize the color drop-out of gray scale 1 gradation.</p> <table border="1"><tr><td>0 $\pm 3\%$ (burst ratio)</td></tr></table>  | 0 $\pm 3\%$ (burst ratio) | | | | | | | | | | | |
| 0 $\pm 3\%$ (burst ratio) | | | | | | | | | | | | | |

Repeat the adjustments described in items 13 and 14 until the specified values are obtained.

9-6. DETAILED EXPLANATION OF AF SYSTEM ADJUSTMENT

1. ADJUSTMENT OF AF NOISE LEVEL STORAGE

Outline :

An adjustment is made so that the noise level of each focus data obtained during auto-focus operation is stored in the memory. The auto-focus is set based on the stored data.

Adjustment :

While the iris is closed completely, the noise level in AF data is stored in AGC cut, intermediate gain and maximum gain states.

Operation procedure :

- (1) Widen the AF evaluation area, and completely close the iris.
- (2) Set the AGC gain to minimum, and wait for several seconds.
- (3) Write the narrow band data in the address 88H to 89H and the wide band data in the address 8EH to 8FH.
- (4) Set the AGC gain to the intermediate gain, and wait for several seconds.
- (5) Write the narrow band data in the address 8AH to 8BH and the wide band data in the address 90H to 91H.
- (6) Set the AGC gain to maximum, and wait for several seconds.
- (7) Write the narrow band data in the address 8CH to 8DH and the wide band data in the address 92H to 93H.
- (8) Restore the initial state of iris.

2. Adjustment of photo interrupter shield plate length of focusing lens

Outline :

An adjustment is made to determine the length of shield plate which is taken as standard for master lens positioning. The step error correction of master lens is performed based on the stored data.

Adjustment :

The length of shield plate is stored in the memory as the number of focus steps.

Operation procedure :

At first, move fully the master lens at the CCD side, and detect the CCD side shield plate edge. After the CCD side edge is detected,

move the master lens to the front side, and find the opposite edge. After the front side edge is detected, count the number of steps to know the width of shield plate, and write it in the address 80H to 81H.

3. Adjustment of photo interrupter shield plate length of zooming lens.

Outline :

An adjustment is made to determine the length of shield plate which is taken as standard for zooming lens positioning.

Adjustment :

The length of shield plate is stored in the memory as the number of zoom steps.

Operation procedure :

At first, move fully the zooming lens at the front side, and detect the front side shield plate edge. After the front side edge is detected, move the zooming lens to the CCD side, and find the opposite edge. After the CCD side edge is detected, count the number of steps to know the width of shield plate, and write it in the address 82H to 83H.

4. Adjustment of WIDE end ∞ position storage

Outline :

An adjustment is made to detect the position of ∞ at the WIDE end by actuating the auto-focus and to store it in the memory. Calculation of zoom tracking curves is performed based on the stored data.

Adjustment :

The ∞ position at the WIDE end is stored as the number of steps from the CCD side shield plate edge.

Operation procedure :

At first, move the zoom lens by the WIDE end, and set the focus operation speed to "medium speed", and actuate the auto-focus. After proper focus position has been obtained, store the focus position in the address 82H to 83H. After that stop again the auto-focus to end.

5. Adjustment of TELE end ∞ position

Outline :

An adjustment is made to detect the ∞ position at the TELE end by actuating the auto-focus and to store it in the memory. Correction of zoom tracking curve with respect to deviation of front lens is performed based on the stored data.

Adjustment :

The ∞ position at the TELE end is stored as the number of steps from the CCD side shield palate edge. The position of TELE end 1m based on the TELE end ∞ and the number of steps of maximum focus moving range are stored in the memory.

Operation procedure :

At first, move the zoom lens by the TELE end, and set the focus operation speed to "medium speed", and actuate the auto-focus. After proper focus is obtained store the focus position in the address 84H to 85H. Then, stop again the auto-focus. Taking the TELE end ∞ as a standard, store the step position of TELE end 1m in the address AAH to A3H, and store the maximum step position of focuses moving range for the whole zoom area in the address ACH to ADH. Then, end.

AE BASIC ADJUSTMENT

For this adjustment the camera microcomputer itself executes auto-tuning.

This adjustment is started when the data '01'H is written in the address 'FE'H of EEPROM in the auto-focus adjustment mode. If 'FF'H is returned, the adjustment is completed. If other signal is returned, an error occurs.

HOLE OFFSET ADJUSTMENT

Make an adjustment so that the specified Hall element output voltage is obtained while the iris is opened.

IRIS OFFSET ADJUSTMENT

Gradually close the fully opened iris, and store the iris offset value at which the specified Hall element output voltage is obtained.

IRIS CLOSE ADJUSTMENT

Gradually lower the iris voltage where the iris is closed, and adjust the voltage at which the iris begins to open.

BASIC AE ADJUSTMENT ERRORS

If data '01'H is written in the address FEH but it fails to end in 'FF'H, the following error exists.

11H HOLE OFFSET ERROR

When the hole offset voltage (approx. 3V) is output for the first time with the iris opened, the hole voltage must be higher than approx. 3.1V. However, the obtained voltage was lower than the specified value.

--> Iris failure, hole input/output circuit failure

12H HOLE OFFSET ADJUSTMENT ERROR

When the hole offset voltage was reduced gradually from approx. 3V to set the hole voltage to approx. 3.1V, it exceeded 3.1V.

--> Hole input/output circuit failure

13H HOLE OFFSET ADJUSTMENT ERROR

When the hole offset voltage was reduced gradually from approx. 3V to set the hole voltage to approx. 3.1V, setting was disabled although the hole offset voltage was 0V.

--> Hole input/output circuit failure

14H IRIS OFFSET ADJUSTMENT ERROR

When the iris output voltage is approx. 0.3V with the iris opened, and the iris offset voltage of approx. 2V is output, the hole voltage must be higher than approx. 3.1V. However, the obtained voltage was lower than the specified value.

--> Iris offset circuit failure

15H IRIS OFFSET ADJUSTMENT ERROR

When the iris offset voltage was raised gradually from approx. 0.3V to set the hole voltage to approx. 3.1V, it exceeded approx. 3.1V.

--> Iris offset circuit failure

16H IRIS OFFSET ADJUSTMENT ERROR

When the iris offset voltage was raised gradually from approx. 0.3V to set the hole voltage to approx. 3.1V, setting was disabled although the iris offset voltage was 5V.

--> Iris offset circuit failure

17H IRIS CLOSE ADJUSTMENT ERROR

When the iris output voltage of approx. 4.5V is output with the iris closed, the hole voltage must be lower than approx. 2.8V. However, the obtained hole voltage was higher than the specified value.

--> Iris failure, iris circuit failure

18H IRIS CLOSE ADJUSTMENT ERROR

When the iris output voltage of approx. 4.5V is output and it is lowered gradually, the hole voltage must be lower than approx. 2.8V. However, the obtained voltage was higher than the specified value.

--> Iris failure, iris circuit failure

19H IRIS CLOSE ADJUSTMENT ERROR

When the iris output voltage was lowered gradually to check hole voltage change point, the hole voltage did not change although the iris output voltage became 0V.

1AH IRIS CLOSE ADJUSTMENT ERROR

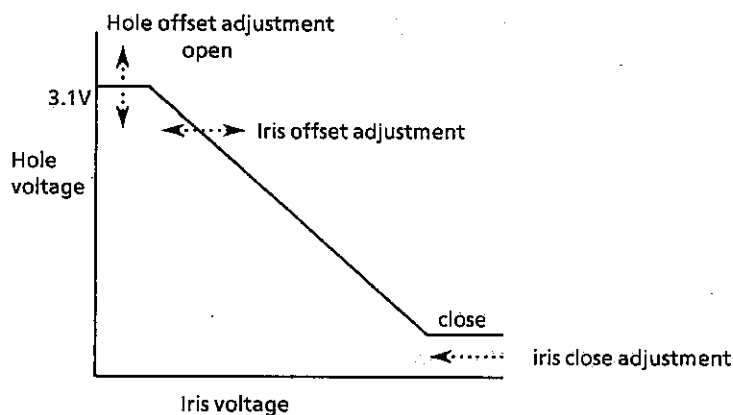
When the iris output voltage was lowered gradually to check the hole voltage change point, the hole output voltage range was too wide although the iris output voltage was proper.

--> Iris failure or significant hole voltage noise

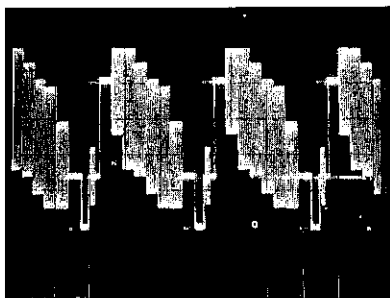
1BH HOLE VOLTAGE ERROR

Hole voltage is not stable.

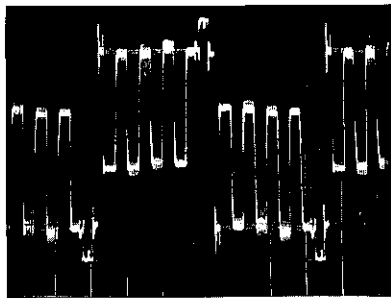
--> Iris failure, hole circuit failure



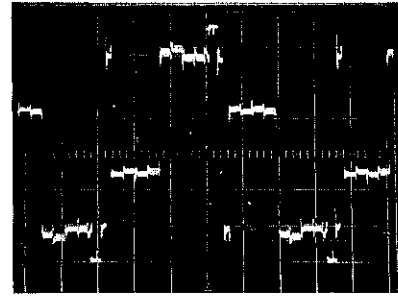
10. LCD DISPLAY



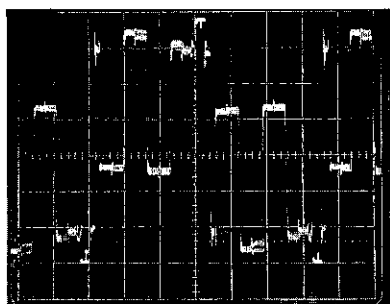
V : 1Vp-p
TP800
LCD video
200mV, 20 μ sec/div



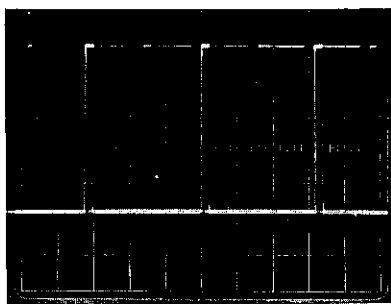
V : 4.8Vp-p (Pedestal - Pedestal)
TP802
B output (VB)
1V, 20 μ sec/div



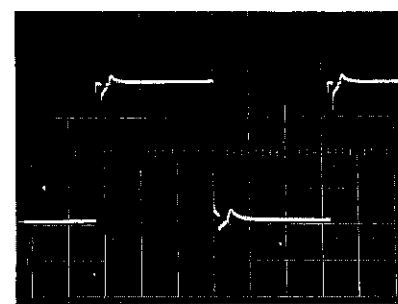
V : 4.6Vp-p (Pedestal - Pedestal)
TP803
G output (VG)
1V, 20 μ sec/div



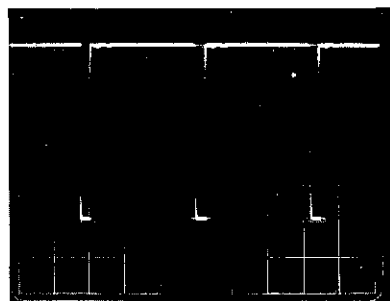
V : 4.9Vp-p (Pedestal - Pedestal)
TP804
R output (VR)
1V, 20 μ sec/div



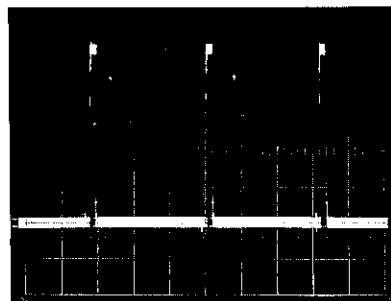
V : 4.6Vp-p
TP805
H SYNC
1V, 20 μ sec/div



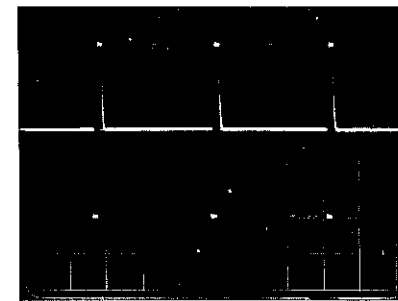
V : 4Vp-p
TP806
Common voltage
1V, 20 μ sec/div



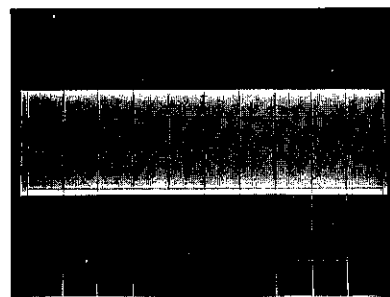
V : 5Vp-p
TP807
HD
1V, 20 μ sec/div



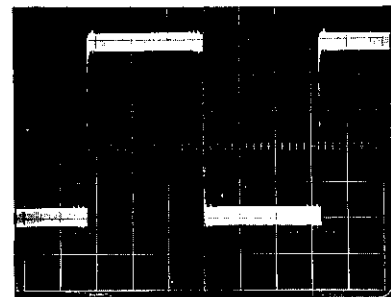
V : 5Vp-p
TP808
SPD (start signal for source driver)
1V, 20 μ sec/div



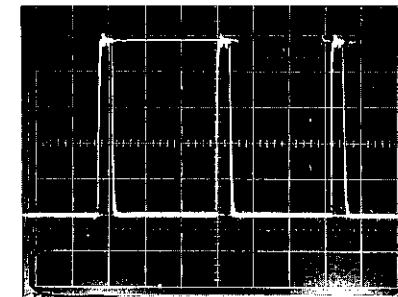
V : 4.8Vp-p
TP809
PDP
1V, 20 μ sec/div



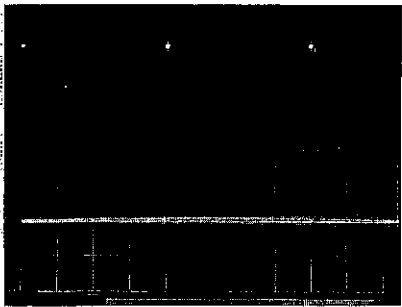
V : 3Vp-p
CLD
(clock signal for source driver)
1V, 20 μ sec/div



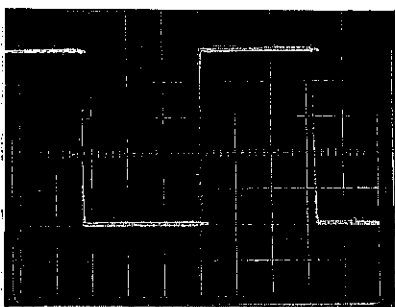
V : 5Vp-p
RES
(Color switching signal for source driver)
1V, 20 μ sec/div



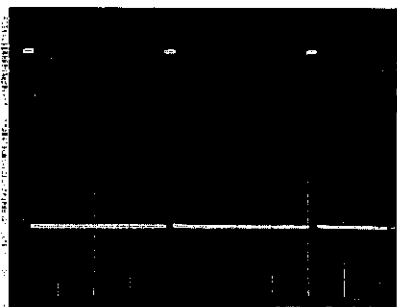
V : 4.9Vp-p
CLS
(clock signal for gate driver)
1V, 20 μ sec/div



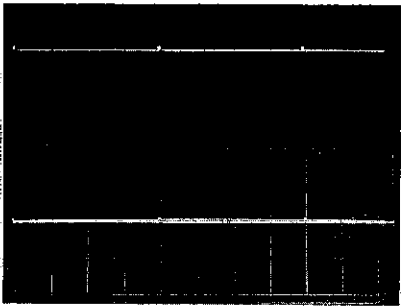
V : 4.8Vp-p
SPS
(start signal for gate driver)
1V, 5msec/div



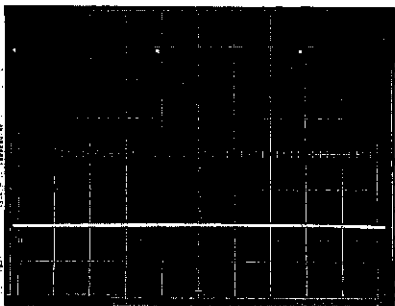
V : 4.9Vp-p
TL837
FRP (inversion signal)
1V, 20μsec/div



V : 4.9Vp-p
IC801 5 pin
VIN
1V, 5msec/div



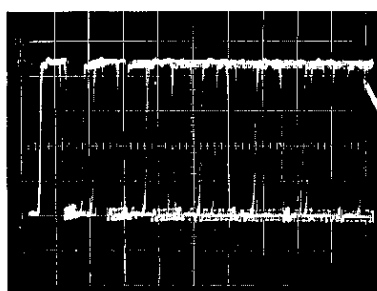
V : 4.8Vp-p
IC801 3 pin
CSYNC
1V, 5msec/div



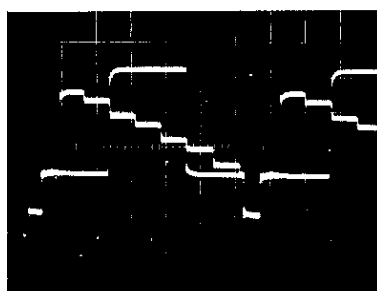
V : 4.8Vp-p
IC801, 1 pin
CVIN
1V, 5msec/div

WAVEFORMS OF SIGNAL PROCESSING SYSTEM

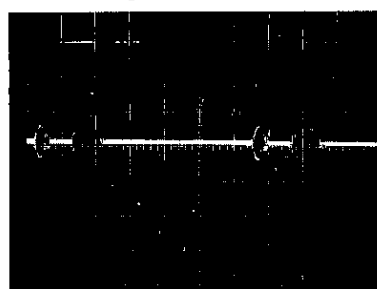
Y/C-C CIRCUIT



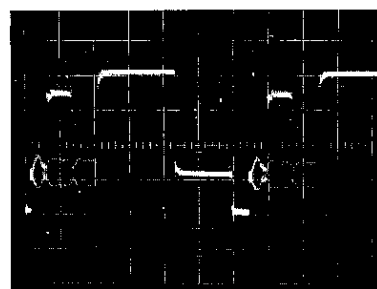
Hi8, VCR stop mode
(Color bar input)
(Applied tape: Hi8MP)
TP404, record FMY signal
100 mV, 0.1 μ sec/div



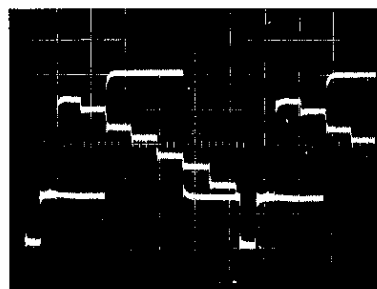
Hi8, playback mode (color bar playback)
(Applied tape: Hi8MP)
TP1403, playback S output (Y signal)
500 mV, 10 μ sec/div



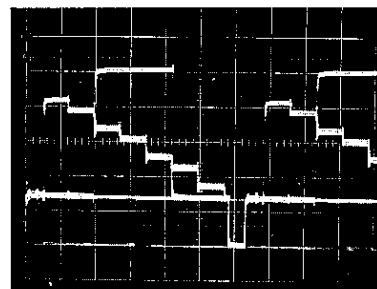
Hi8, playback mode (color bar playback)
(Applied tape: Hi8MP)
TP1404, playback S output (C signal)
500 mV, 10 μ sec/div



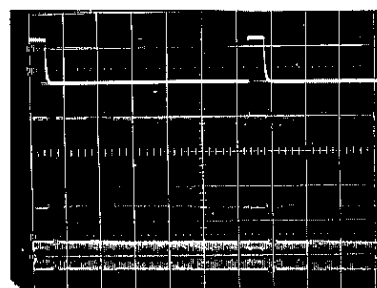
Hi8, playback mode (color bar playback)
(Applied tape: Hi8MP)
TP406, 1HCCD input signal
100 mV, 10 μ sec/div



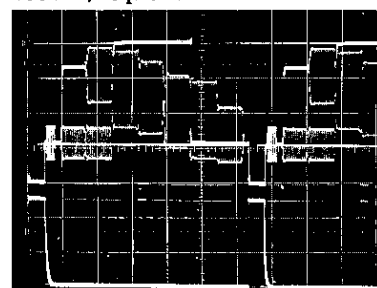
Hi8, playback mode (color bar playback)
(Applied tape: Hi8MP)
TP406, 1HCCD input signal
100 mV, 10 μ sec/div



Hi8, VCR stop mode
(Color bar input)
(Applied tape: Hi8MP)
TP403, preemphasis input
Y signal (same as TP402)
100 mV, 10 μ sec/div

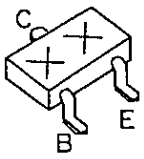


Record mode (color bar input)
(Applied tape: Hi8MP)
Upper: IC401, 24pin (Y/C circuit)
C-SYNC signal, 2V, 10 μ sec/div
Middle: P35 connector 1 pin FM record
current
100 mV/10 μ sec/div
Lower: P35 connector 26 pin FM record
current
100 mV/10 μ sec/div

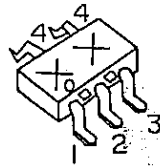


Hi8, VCR stop mode
(Color bar input)
(Applied tape: Hi8MP)
Upper: 1 ch TP1401 Video input signal
500 mV/div
10 μ sec/div
Lower: 2 ch IC401, 24pin C-SYNC signal
1V/div
10 μ sec/div

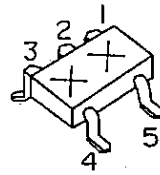
11. SHAPE OF SEMICONDUCTORS



2SA1037
Q1302, 1304
2SA1162Y
2SA1298Y
Q905
2SA1577R
Q421
2SA1774F
Q402, 408, 409, 416, 419, 435, 436, 437, 441,
1401, 1405, 1710, 2401, 2420, 3405, 3410, 3445,
3448
2SB12956
Q906, 6402
2SB1462
Q13, 151
2SC3931C
Q308, 309, 403, 424, 3401, 3402, 3408, 3409,
3442, 3443, 3444, 3447
2SC4116Y
Q909
2SC4555
Q410, 411, 422
2SC4617B
Q311, 401, 414, 420, 426, 432, 433, 434, 440, 442,
443, 444, 445, 446, 448, 449, 450, 1403, 2402,
2404, 2405, 2409, 2418, 3404, 3406, 3407, 3416
2SC4627
Q2
2SD1819A
Q6601, 6611, 6622
2SD2216
Q11, 152, 244, 556,
558, 810, 904, 911, 914
2SD602A
Q439
BC847B1F
DTA114EE
Q301
DTA144EE
Q405, 407, 811, 1303,
1709, 2416, 3441,
3446
DTC114EE
Q415
DTC144EE
Q406, 412, 413, 1301,
1404, 2413, 2417, 3411
DTC144EU
Q425
DTC323
Q602, 603, 6405, 6406
RN2104
Q447
UN5111
Q702
UN5113
Q605, 609
UN9213
Q606, 6401, 6403

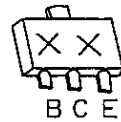


FP101
Q809, 901, 902
FP103
Q915

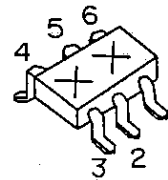


UMA2
Q417, 431
UMA7
Q552
UMG2
Q306, 418,
2419, 6404
UMG8
Q554
XP1113
Q312, 313
XP1213
Q551

XP1501
Q12
NJM2107F
IC602, 803
TA75S01F
IC6602
TC7S04F
IC1708
TC7S08F
IC706
TC7S32F
IC705



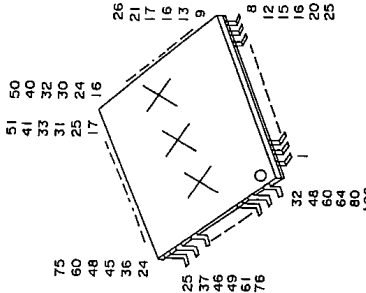
2SB1121T
Q908, 1708
2SB1132Q
Q557
2SB1302S
Q903, 907, 910
2SD874AS
Q555



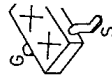
RN4604
Q601



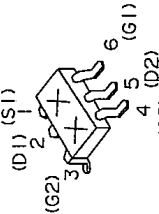
FMC5
Q701, 703
FMS1
Q604
FMY1
Q917



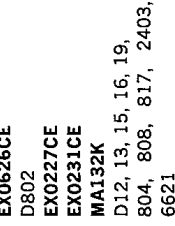
MA335Q
D806
SFPB52
D900



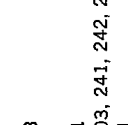
J148TA
J151TA
EX0226CE
D805
EX0626CE
D802
EX0227CE
EX0231CE
MA132K
D12, 13, 15, 16, 19,
804, 808, 817, 2403,
6621



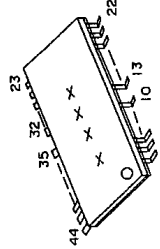
2SK160
Q1
2SK94



DAN202U
D701, 702, 1701, 1702,
1703
HVM17
D402, 816
MA132WK
D904, 1401, 1406, 2401



XP4113
Q913
XP4213
Q912
XP4601
Q14, 203, 241, 242, 423, 801, 803, 804, 808
XP6401
Q314, 315, 562
XP6501
Q302, 303, 304, 305, 310, 404, 427, 608, 1701,
3412, 3440, 6621

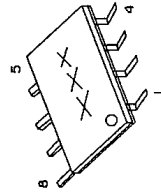


MB811501
IC273, 274, 275



NJM79L09
IC13
PST592EM
IC504

IX0135TA
IX0137TA
IC231
IX0138TA
IX0163TA
IC272
IX0170TA
IC201
IX0177TA
IC501
IX0178TA
IC1701
IX1003GE
IX1004GE
IX1010GE
IC701
IX2089CE
IC801
CA1207AR
IC401
CA1390AR
IC101
CA1507BR
IC152
CXA1208R
IC2401
CXA1399Q
IC151
IX1003GE
IC241
HA118167
IC301
HA118276
IC603
IR3P90Y
IC800
L7A0932
IC276
LR38167
IC271
LZ95D43M
IC11
MB3785V
IC900
MC13400F
IC1401
XR10813
IC1702

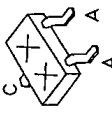


BA7655F
IC407
BA9701F
IC901
CAT35C2K
IC502
CXA1211M
IC3402
CXL5504M
M5222FP
IC6402
NJM2073M
IC6403
NJM2244M
IC1402

NJM2903M
IC805
NJM2904M
IC804
NJM4560M
IC6401
S8420HF
IC702
CA93C46J
IC703
TC4W53F
IC406
TC4W66F
IC601, 554

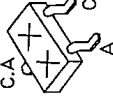


MA132WA
D11, 410, 501

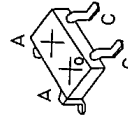


IX0168TA
IC704
IX1021GE
IX1426CE
IC202
CXA1452N
IC408
CXD1250N
IC12
CXL5502M
IC402, 403
LA7470V
IC6601
LB1841V
IC1704
LB1880M
IC1706

LB1881V
IC1705
LB8111V
IC1703
M52083FP
IC3401
M62352GP
IC5401, 5403
M62353GP
IC5402
MB8346BV
IC503
NJM2902V
IC551, 553, 1707
MM1107
IC552



MA147
D809, 3401, 3403



DA227
D901, 902

12. SCHEMATIC DIAGRAMS AND CIRCUIT BOARDS

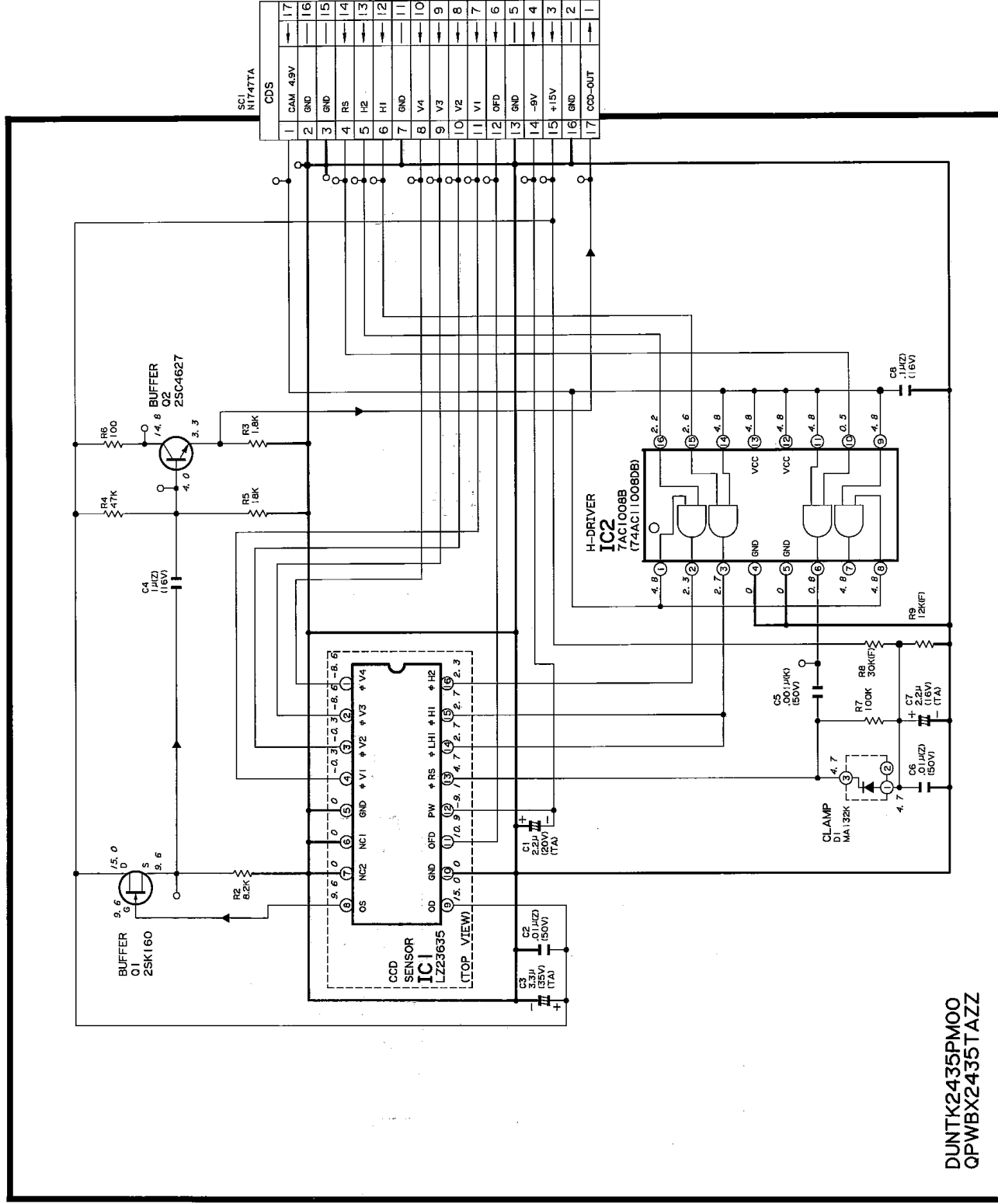
12-1. GENERAL SCHEMATIC DIAGRAM



12-2. CCD CIRCUIT BASIC SCHEMATIC DIAGRAM

- Since this schematic diagram shows a basic circuit, it may differ insignificantly depending on set.
- Voltages are measured in the gray scale image shoot state.

► Luminance/Color signal

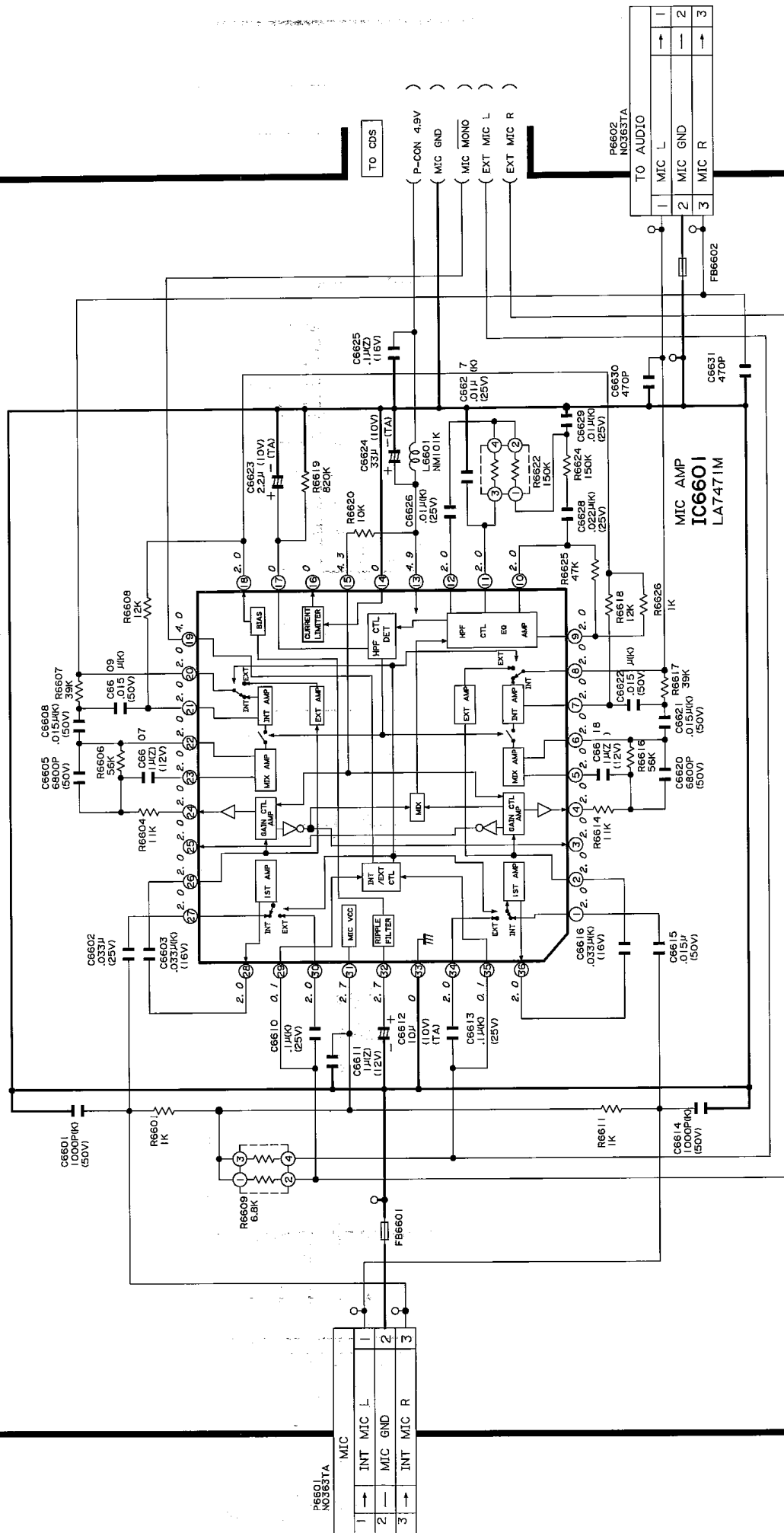


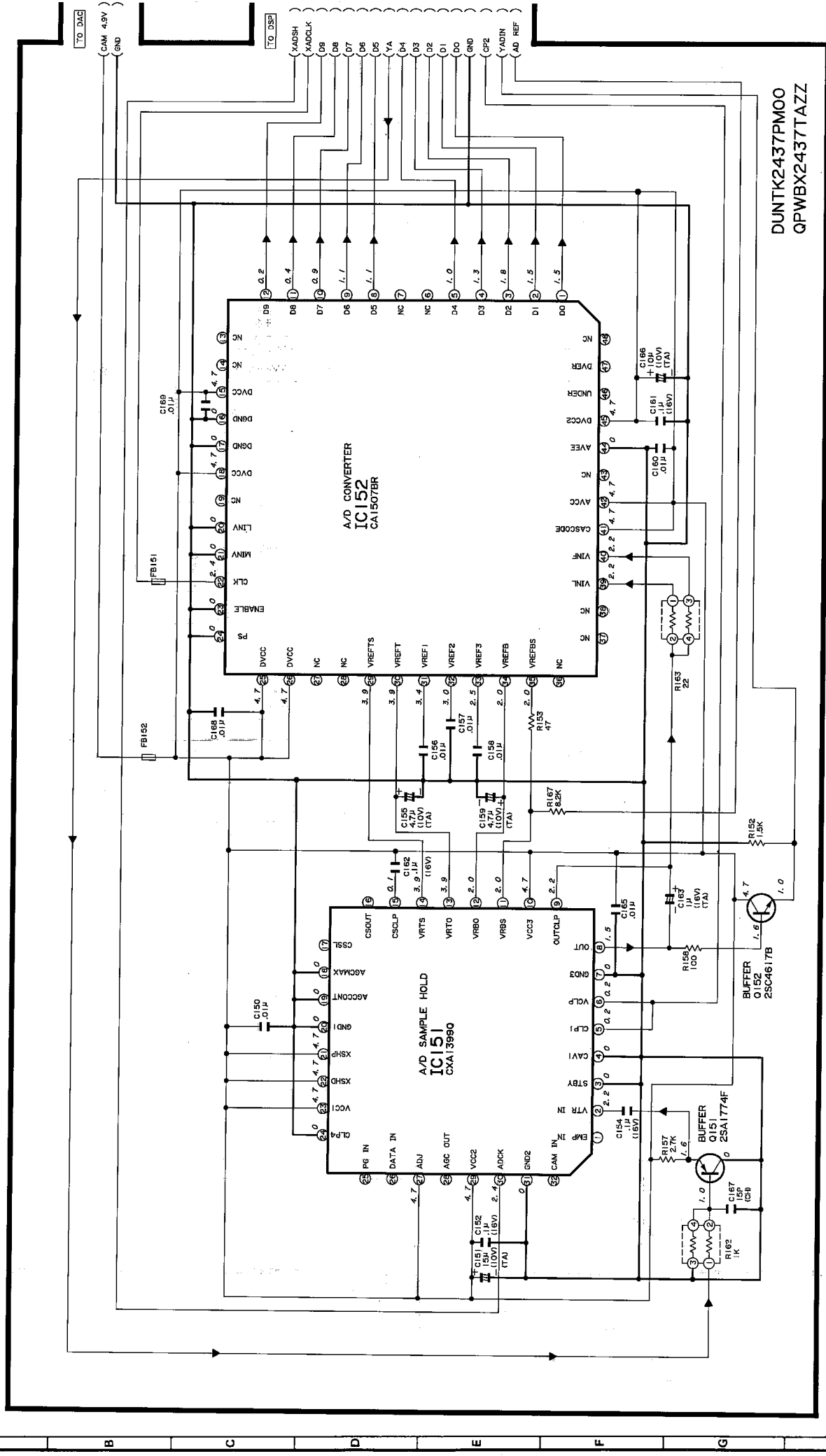
READ ON ▶ Luminance/Color signal

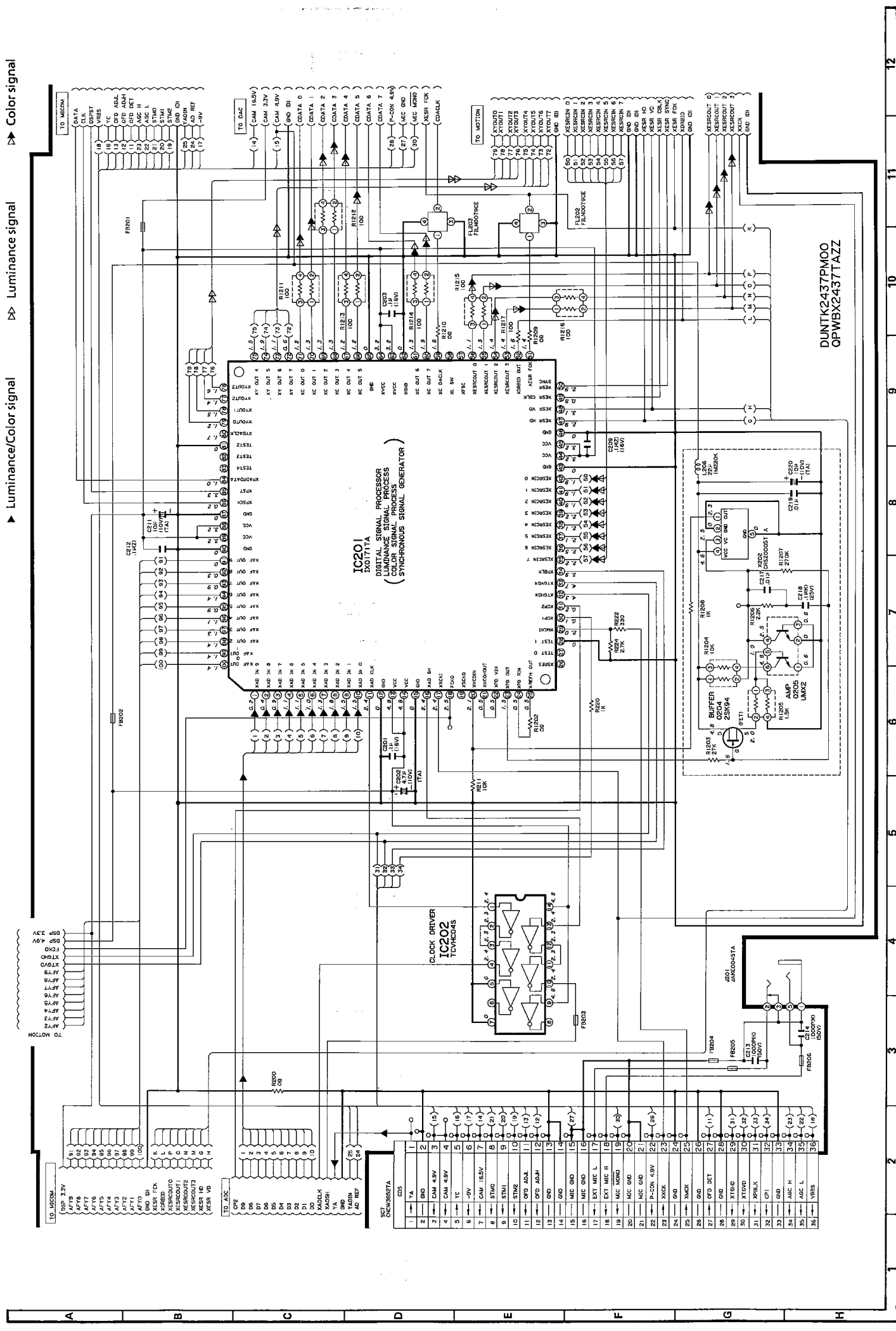


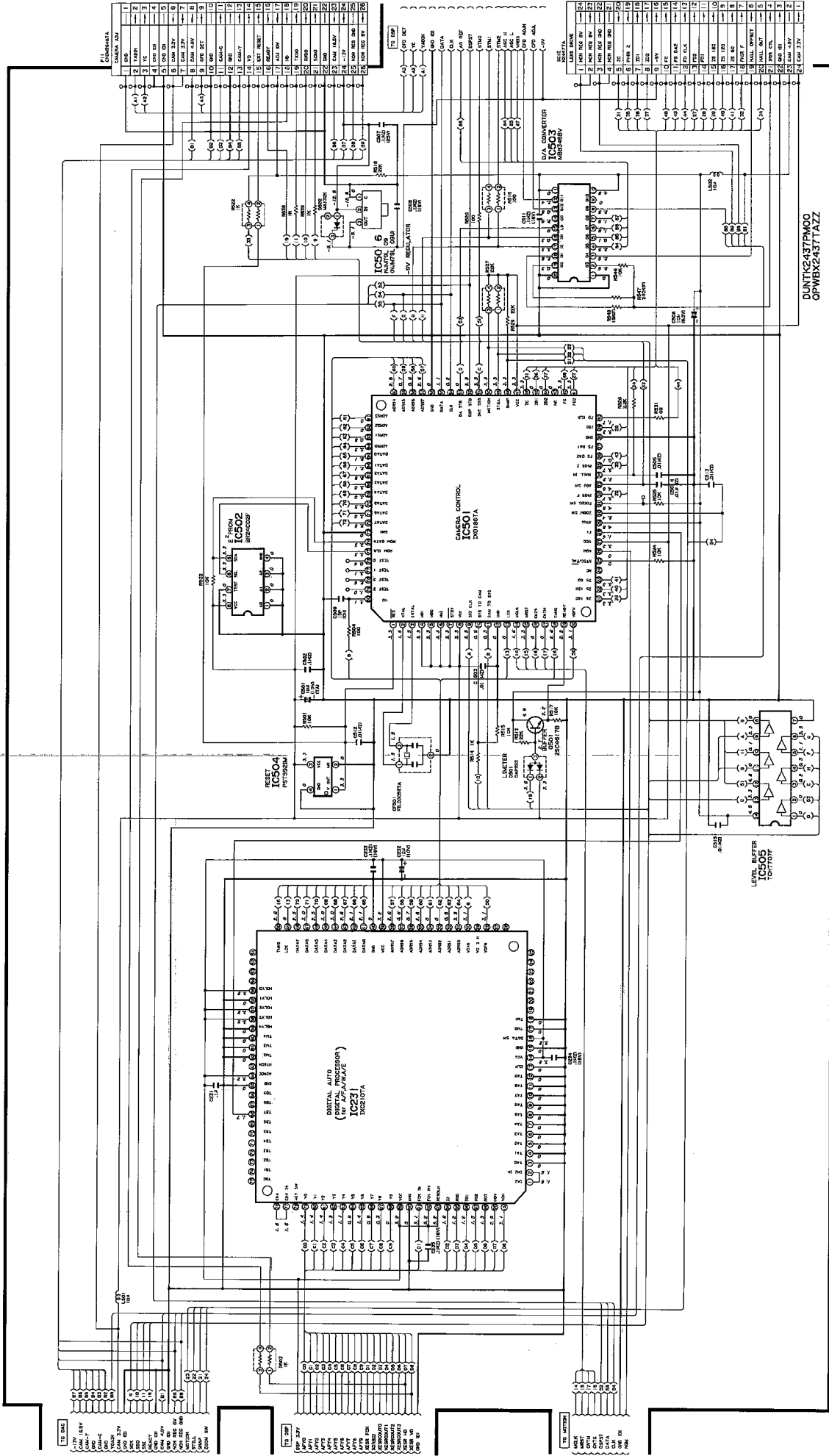
DUNTK2436PM00
QPWBX2436TAZZ

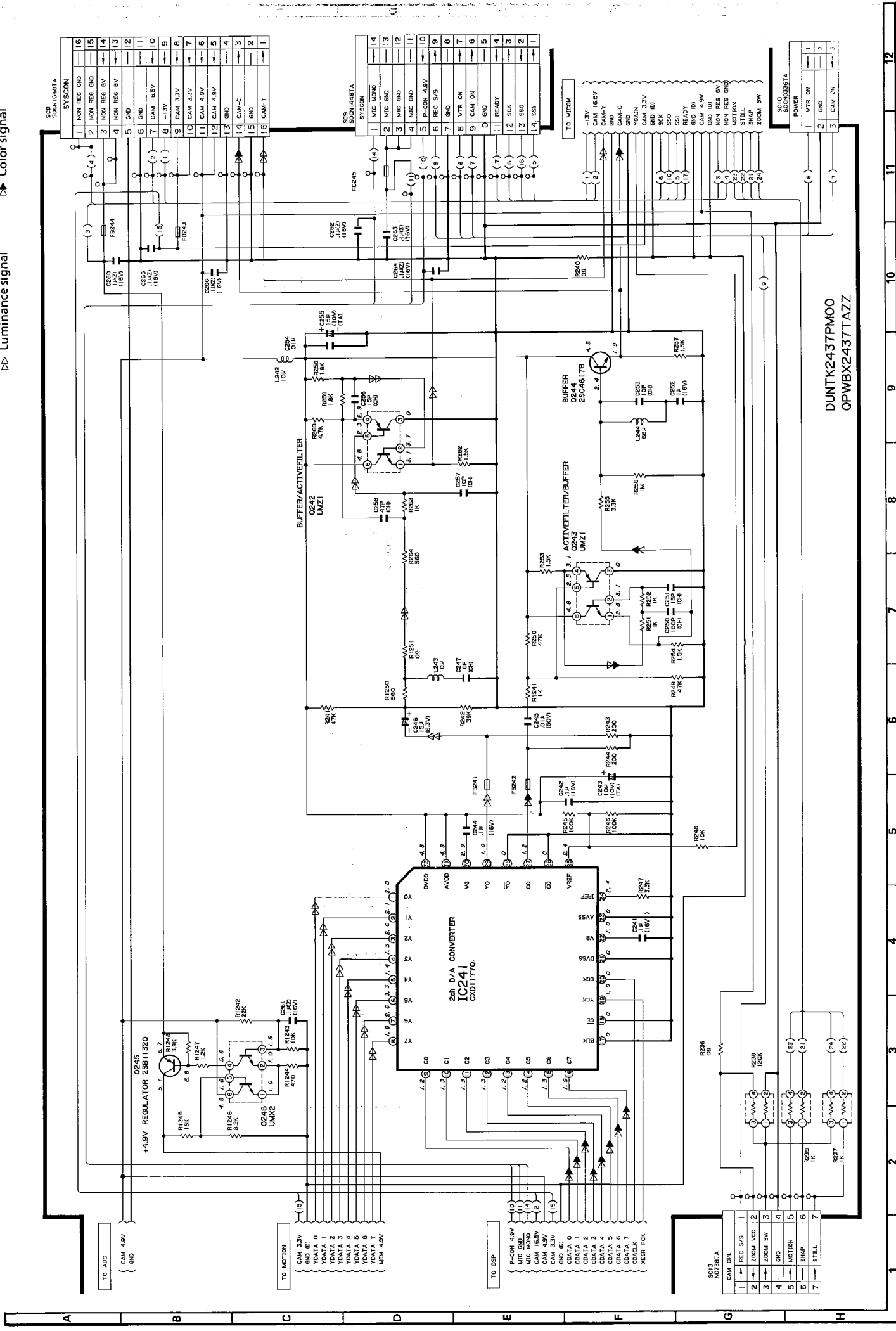
➤ Mic audio signal



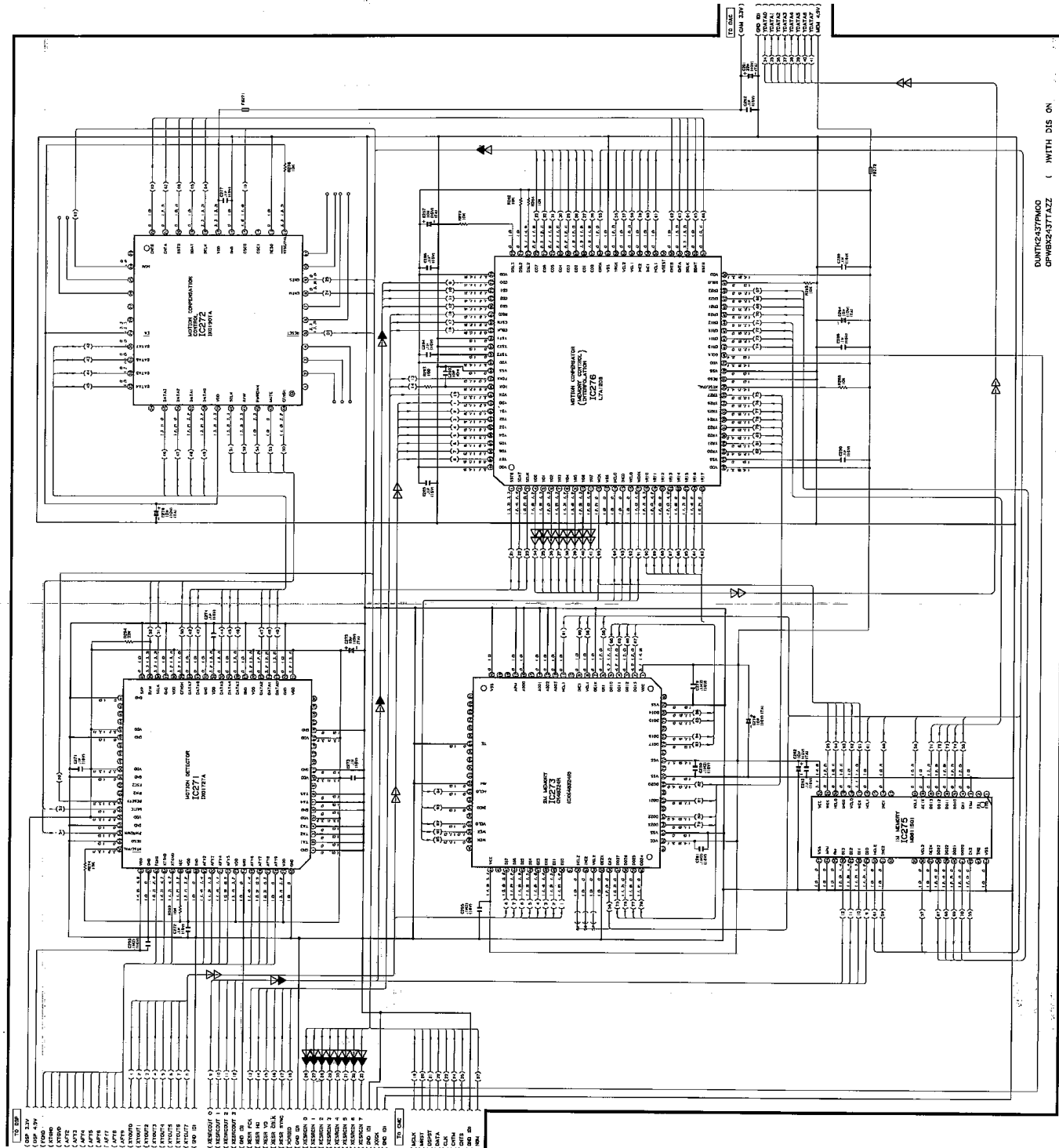






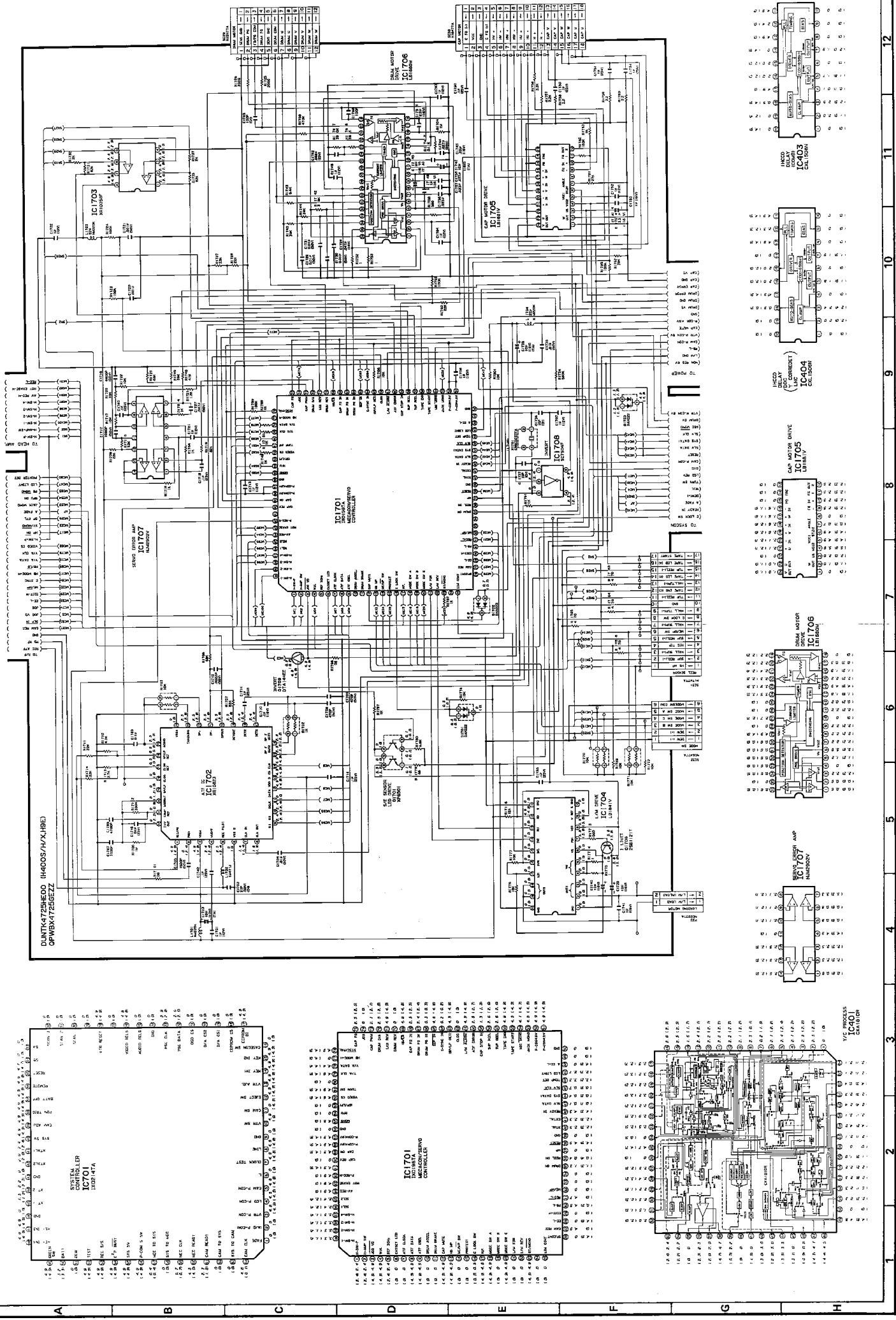


▷ Luminance signal
▷ Color signal





VL-H400S/H/X
VL-H9E
VL-H400S/H/X
VL-H9E



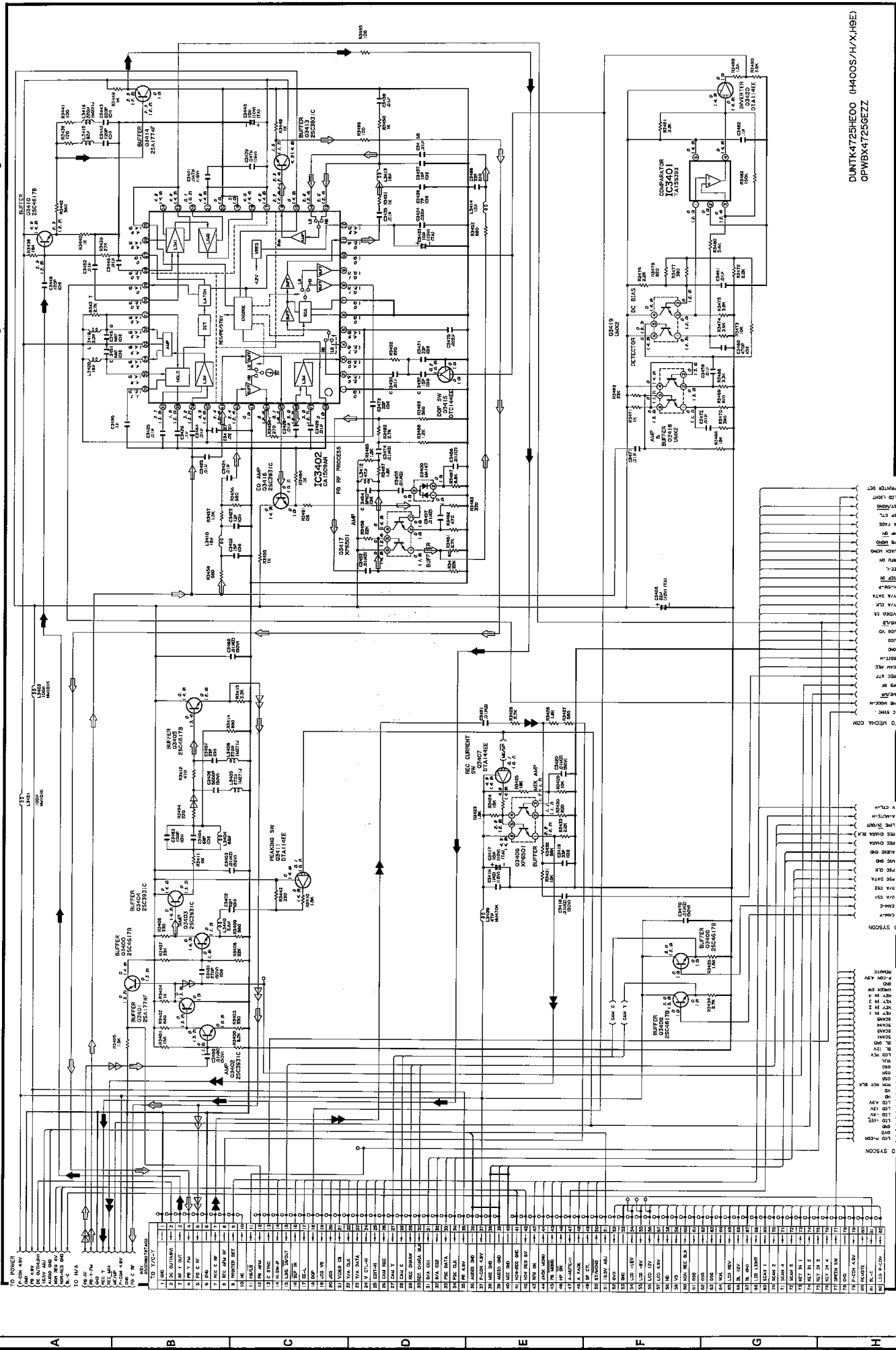
VL-H400S/H/X
VL-H9E

VL-H400S/H/X
VL-H9E



VL-H400S/H/X
VL-H9EVL-H400S/H/X
VL-H9E

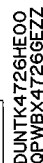
 PB luminance signal
 PB chroma signal
 REC chroma signal
 REC luminance signal



DUNTK4725HE00 (H400S/H/X,H9E)
QPWBX4725GEZZ

AA AND SHADED COMPONENTS = SAFETY RELATED PARTS





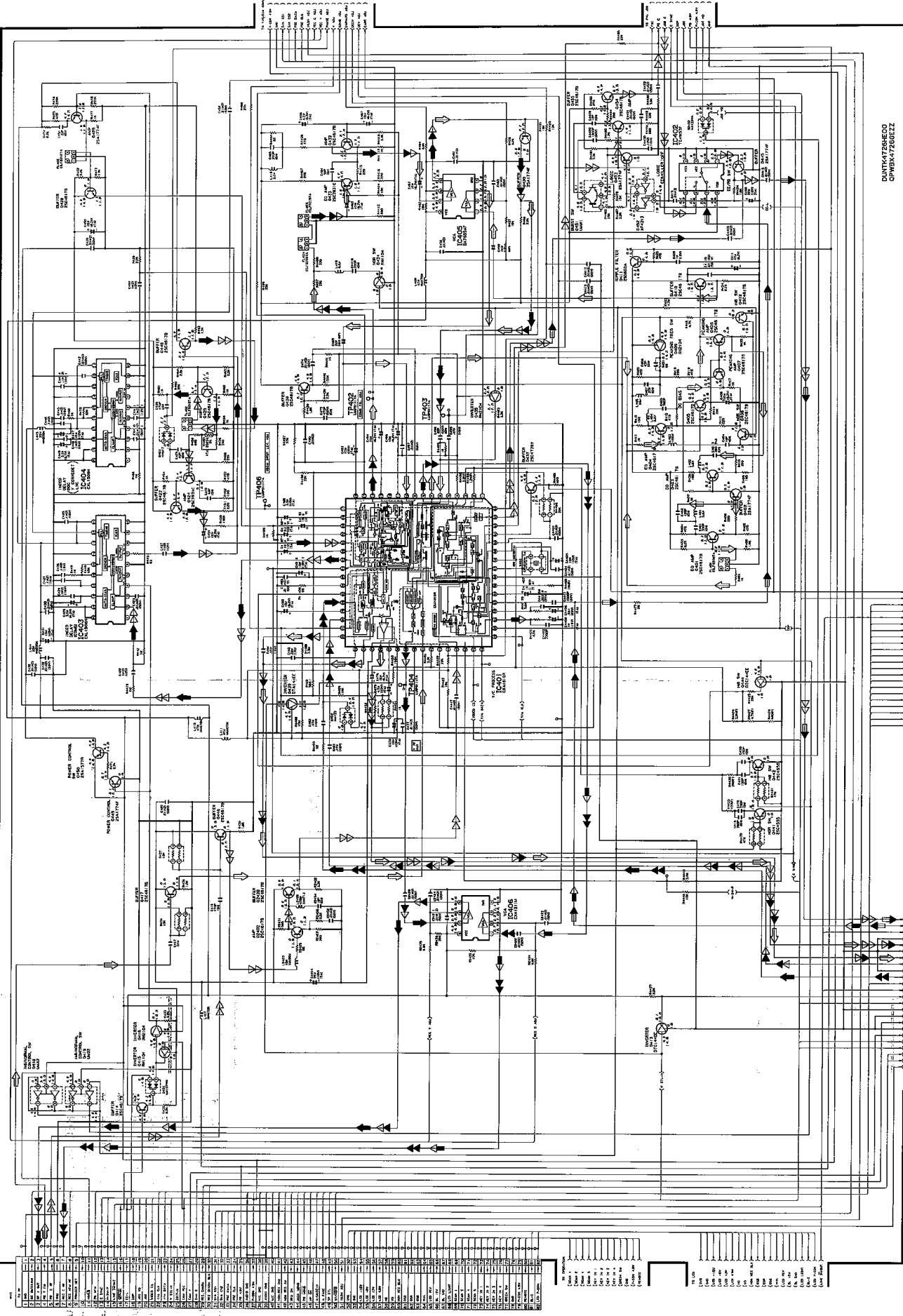
- ↑ REC chroma signal (Camera input)
 ↑ REC luminance signal (Camera input)
 → REC luminance signal (S terminal input)
 → REC chroma signal (S terminal input)
 ↑ REC chroma signal (Video input)
 ↑ REC luminance signal (Video input)
 ⇄ PB luminance signal
 ⇄ PB chroma signal
 → EE chroma signal (Camera input)
 → EE luminance signal (Camera input)

| TO | FROM | DATE | TIME | DESCRIPTION |
|----|------|----------|-------|----------------|
| 1 | TO | 11/11/11 | 10:00 | PRINTED VIDEO |
| 2 | TO | 11/11/11 | 10:05 | PRINTED VIDEO |
| 3 | TO | 11/11/11 | 10:10 | JACK MONO |
| 4 | TO | 11/11/11 | 10:15 | AUDIO-R INVOIT |
| 5 | TO | 11/11/11 | 10:20 | AUDIO-R INVOIT |
| 6 | TO | 11/11/11 | 10:25 | AUDIO-R INVOIT |
| 7 | TO | 11/11/11 | 10:30 | AUDIO-R INVOIT |
| 8 | TO | 11/11/11 | 10:35 | DC OUT(14V) |
| 9 | TO | 11/11/11 | 10:40 | DC OUT |
| 10 | TO | 11/11/11 | 10:45 | VIDEO INVOIT |
| 11 | TO | 11/11/11 | 10:50 | VIDEO INVOIT |
| 12 | TO | 11/11/11 | 10:55 | VIDEO INVOIT |
| 13 | TO | 11/11/11 | 11:00 | VIDEO INVOIT |
| 14 | TO | 11/11/11 | 11:05 | VIDEO INVOIT |
| 15 | TO | 11/11/11 | 11:10 | VIDEO INVOIT |
| 16 | TO | 11/11/11 | 11:15 | VIDEO INVOIT |
| 17 | TO | 11/11/11 | 11:20 | VIDEO INVOIT |
| 18 | TO | 11/11/11 | 11:25 | VIDEO INVOIT |
| 19 | TO | 11/11/11 | 11:30 | VIDEO INVOIT |
| 20 | TO | 11/11/11 | 11:35 | VIDEO INVOIT |

VL-H400S/H/X
VL-H9E

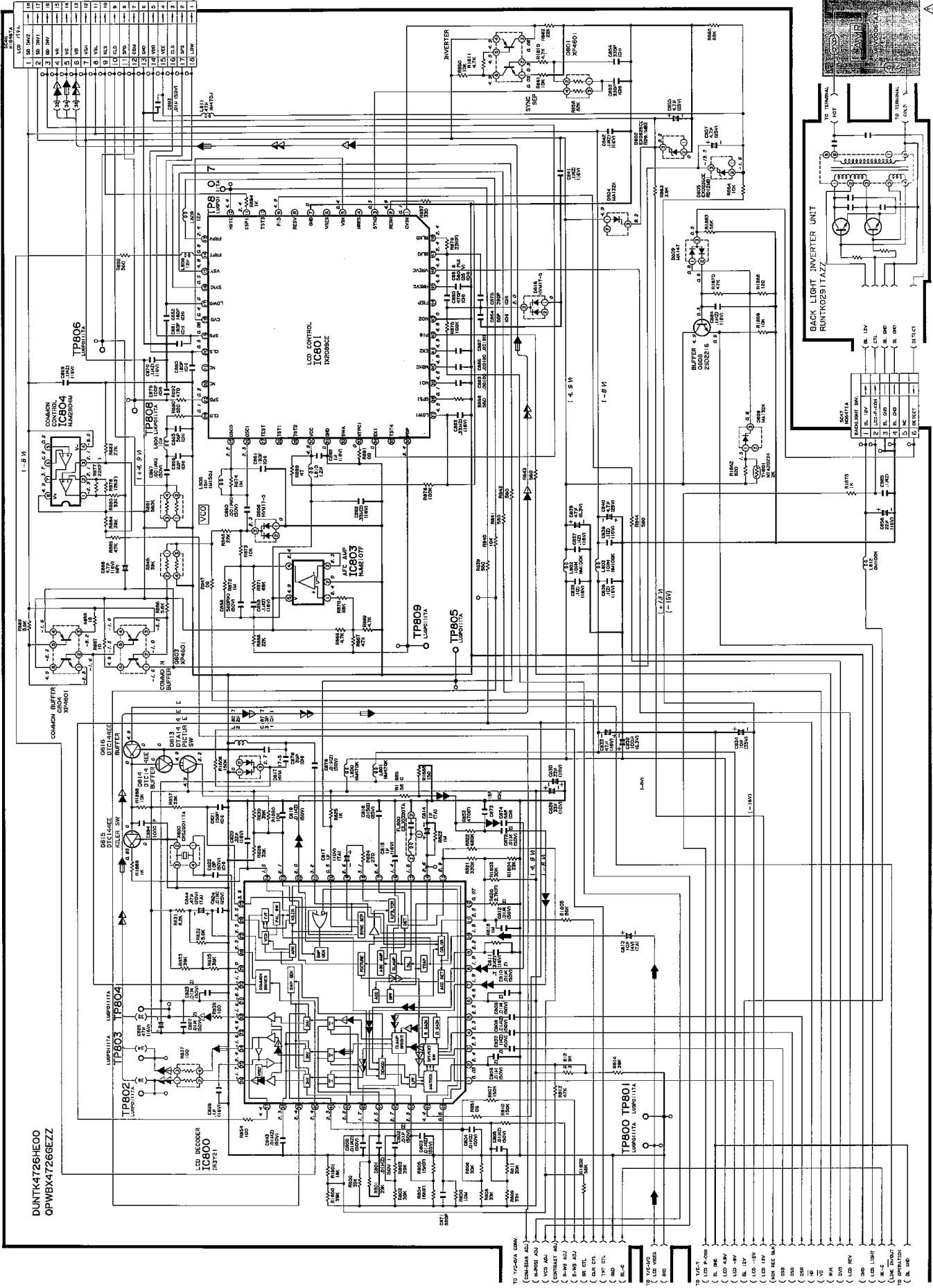
12-18.Y/C-C CIRCUIT BASIC SCHEMATIC DIAGRAM

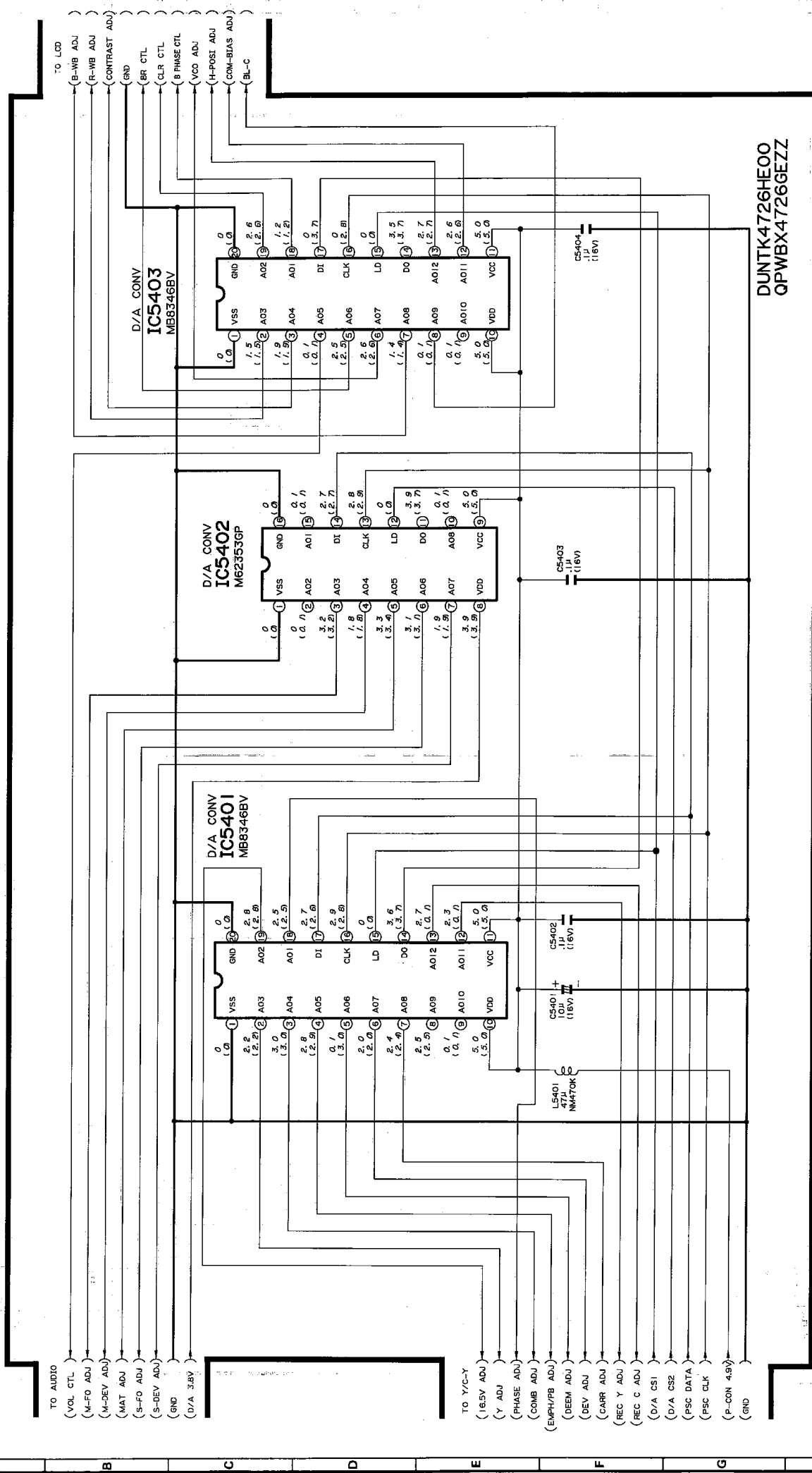
- ⇒ EE chroma signal (Camera input)
- ⇒ REC chroma signal (Camera input, S terminal input)
- ⇒ REC chroma signal (Video input)
- ⇒ PB chroma signal



DUNT4729HED0
CPWBX4726EZZ

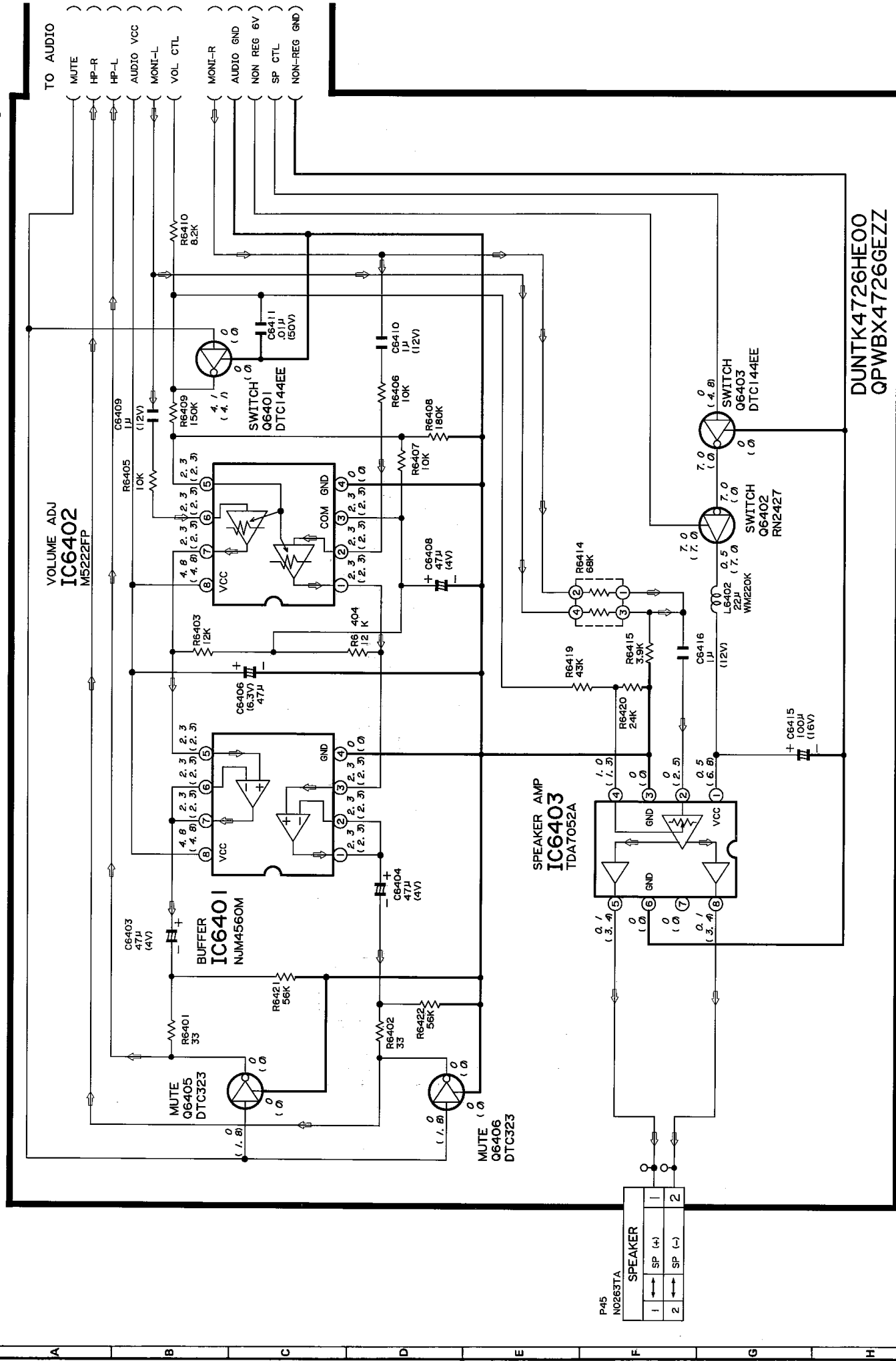
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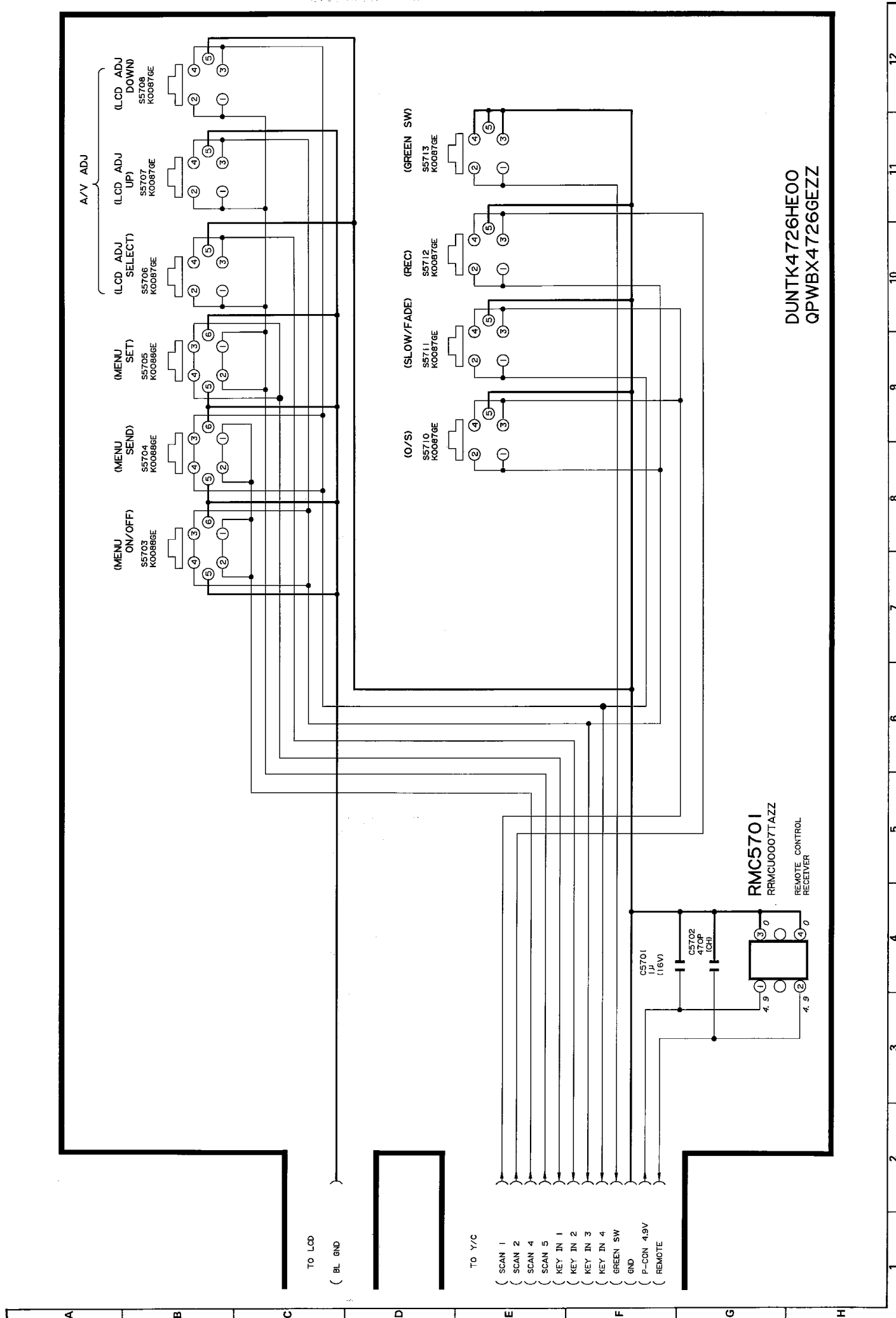




DUNTK4726HE00
QPWBX4726GEZZ

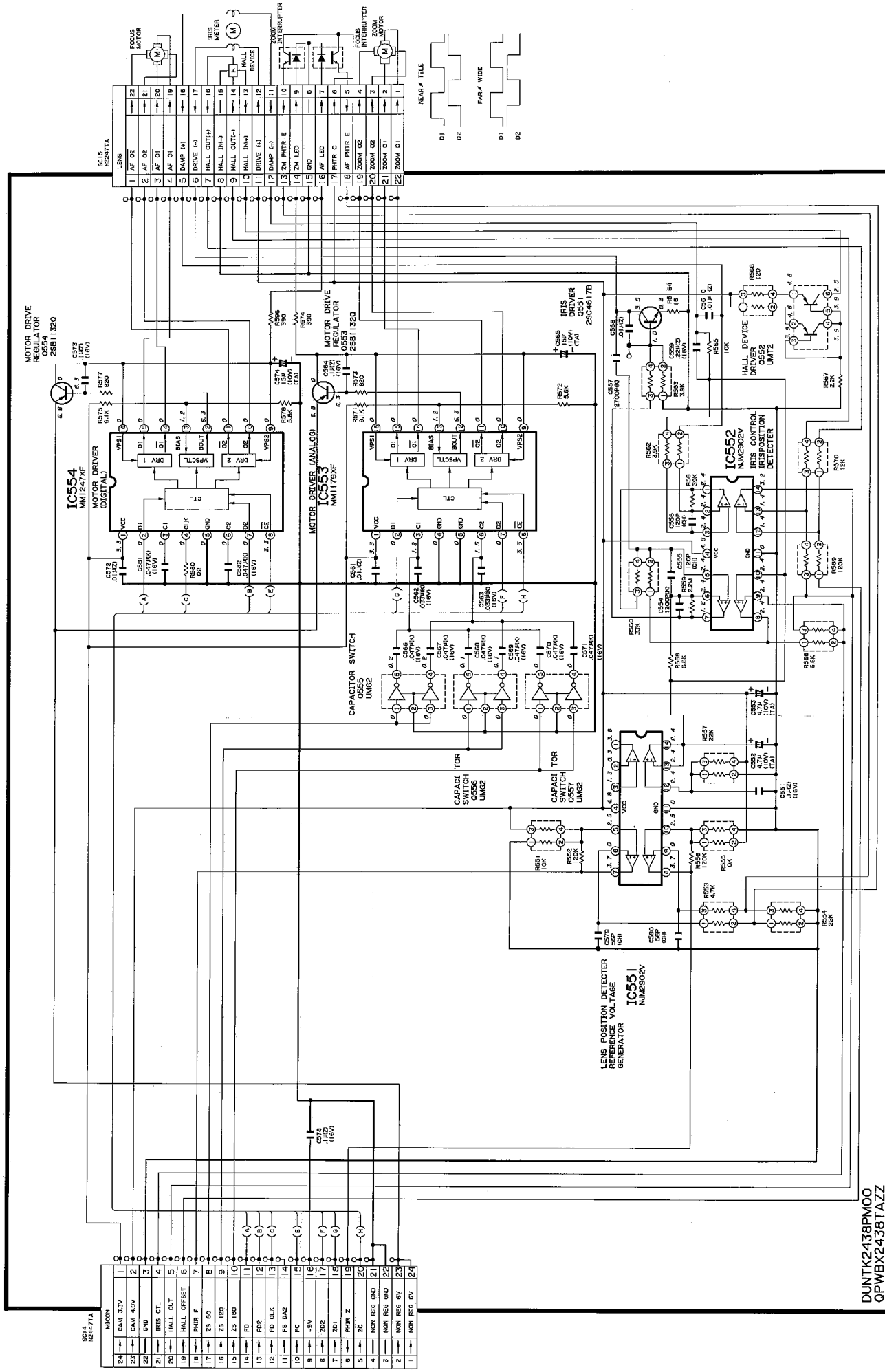
⇒ PB audio signal







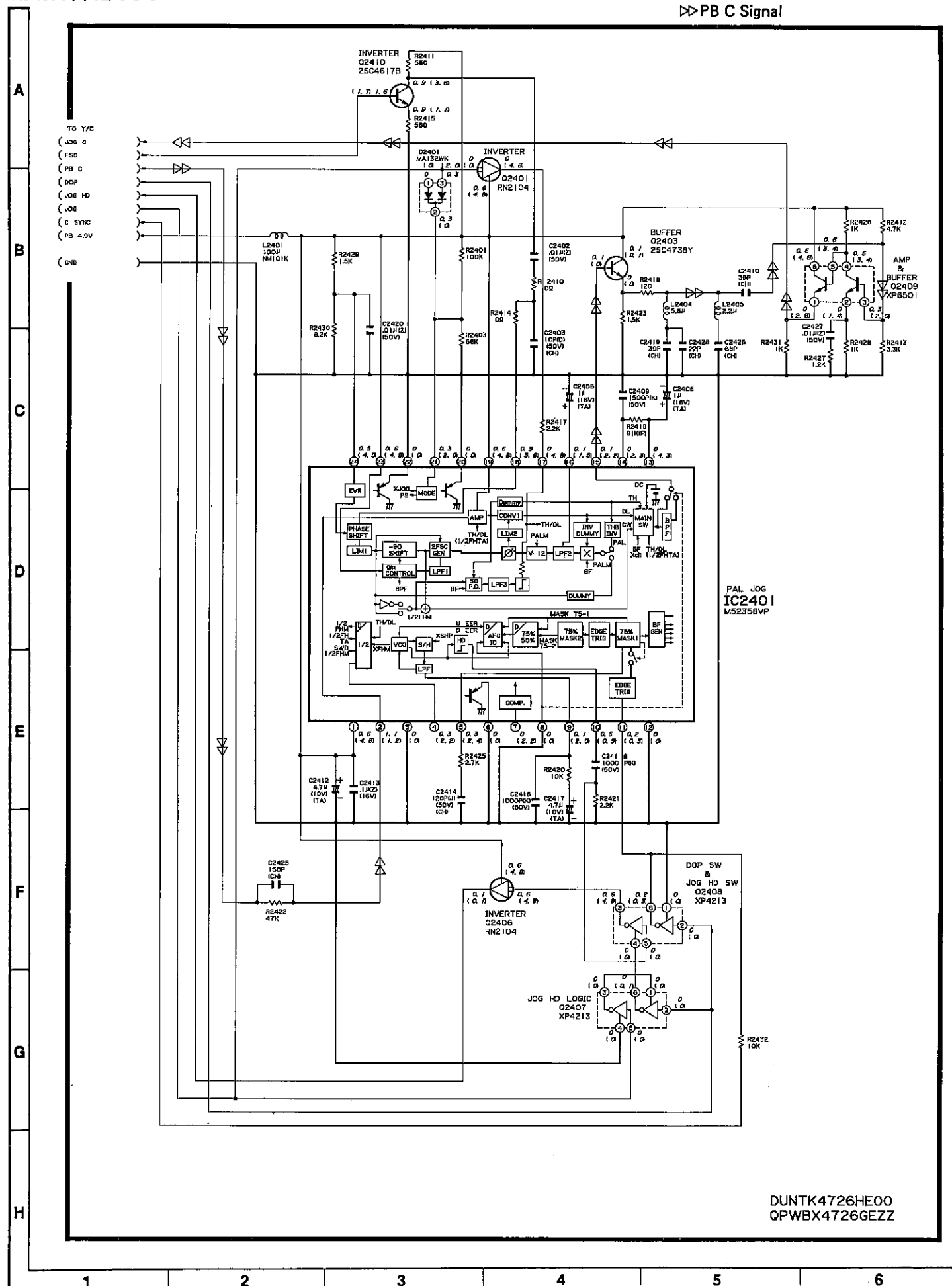
12-26.LENS DRIVE CIRCUIT BASIC SCHEMATIC DIAGRAM



DUNTK2438PM00
QPWBX2438TAZZ

12-27. PAL JOG

PB C Signal



13. PARTS LIST

PARTS REPLACEMENT

Replacement parts which have these special safety characteristics identified in this manual; electrical components having such features are identified by Δ in the Replacement Parts Lists.

The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

- | | |
|-----------------|----------------|
| 1. MODEL NUMBER | 2. REF. NO. |
| 3. PART NO. | 4. DESCRIPTION |
| 5. CODE | |

• PWB Unit Not Supplied.

Δ MARK: SAFETY RELATED PARTS

| Ref. No. | Part No. | ★ | Description | Code |
|-------------------------------|---------------|---|-----------------------|------|
| PRINTED WIRING BOARD ASSEMBLY | | | | |
| | DUNTK2435PM00 | | CCD P.W.B. | - |
| | DUNTK2436PM00 | | CDS P.W.B. | - |
| | DUNTK2437PM00 | | Camera P.W.B. | - |
| | DUNTK2438PM00 | | Lens Drive P.W.B. | - |
| | DSETU0288KE00 | | VCR and LCD PWB Ass'y | - |
| TUNER AND ASSEMBLY UNITS | | | | |
| | RUNTK0291TAZZ | | Inverter Trans Unit | |
| INTEGRATED CIRCUITS | | | | |
| | VHILZ23635/-1 | | I.C. | BQ |
| COIL AND TRANSFORMERS | | | | |
| | PFILW0058TAZZ | | Filter | AW |

| Ref. No. | Part No. | ★ | Description | Code |
|--------------------------|----------------|---|---------------------------------|------|
| DUNTK2435PM00 CCD P.W.B. | | | | |
| INTEGRATED CIRCUITS | | | | |
| IC2 | VH17AC1008B-1 | | 74AC11008DB | AF |
| TRANSISTORS | | | | |
| Q1 | VS2SK160///-1 | | Transistor | AD |
| Q2 | VS2SC4627CD-1 | | Transistor | AB |
| DIODES AND LED'S | | | | |
| D1 | VHDM132K// -1 | | Diode | AA |
| CAPACITORS | | | | |
| C1 | VCSAPH1DJ225M | | 2.2 μ F 20V Tantalum, (N.P) | AB |
| C2, 6 | VCKYCY1HF103Z | | 0.01 μ F 50V Ceramic | AA |
| C3 | VCSATE1VJ335M | | 3.3 μ F 35V Tantalum, (N.P) | |
| C4 | VCKYTV1CF105Z | | 1.0 μ F 16V Ceramic | AB |
| C5 | VCKYCY1HB102K | | 1000pF 50V Ceramic | AA |
| C7 | VCSATA1CJ225M | | 2.2 μ F 16V Tantalum, (N.P) | AC |
| C8 | VCKYCY1CF104Z | | 0.1 μ F 16V Ceramic | AA |
| RESISTORS | | | | |
| R2 | VRS-CY1JF822J | | 8.2k 0.063W 5% Metal Oxide | AA |
| R3 | VRS-CY1JF182J | | 1.8k 0.063W 5% Metal Oxide | AA |
| R4 | VRS-CY1JF473J | | 47k 0.063W 5% Metal Oxide | AA |
| R5 | VRS-CY1JF183J | | 18k 0.063W 5% Metal Oxide | AA |
| R6 | VRS-CY1JF101J | | 100 0.063W 5% Metal Oxide | AA |
| R7 | VRS-CY1JF104J | | 100k 0.063W 5% Metal Oxide | AA |
| R8 | VRS-CY1JF303F | | 30k 0.063W 1% Metal Oxide | AA |
| R9 | VRS-CY1JF123F | | 12k 0.063W 1% Metal Oxide | AA |
| MISCELLANEOUS PARTS | | | | |
| SC1 | QSO CN1747TAZZ | | Socket | AE |

★ MARK: SPARE PARTS DELIVERY SECTION

| Ref. No. | Part No. | * | Description | Code | Ref. No. | Part No. | * | Description | Code |
|---|----------------|---|------------------------|------|-------------------------------------|---------------|---|-------------------------------|------|
| DUNTK2436PM00 CDS P.W.B. | | | | | C110,
113,
116 | VCKYCY1HF103Z | | 0.01μF 50V Ceramic | AA |
| INTEGRATED CIRCUITS | | | | | C21 | VCEAPE1CW475M | | 4.7μF 16V Electrolytic | AB |
| IC11 | VHILZ95D71M-1 | | I.C. | AR | C24,
42,
44,
6601,
6614 | VCKYCY1HB102K | | 1000pF 50V Ceramic | AA |
| IC12 | VHICXD1267N-1 | | I.C. | | C37,
6612 | VCSATA1AJ106M | | 10μF 10V Tantalum,
(N.P) | AA |
| IC101 | VHICA1390AR-1 | | CXA1390AR | | C38,
39,
40,
41 | VCCCCY1HH470J | | 47pF 50V Ceramic | |
| IC6601 | VHILA7471M/-1 | | LA7471M | | C43 | VCCCCY1HH6R0D | | 6.0pF 50V Ceramic | AA |
| TRANSISTORS | | | | | C46 | VCSATA1AJ475M | | 4.7μF 10V Tantalum,
(N.P) | AC |
| Q14 | VSUMZ11111-1 | | Transistor | AB | C47,
111,
115,
6625 | VCKYCY1CF104Z | | 0.1μF 16V Ceramic | AA |
| DIODES AND LED'S | | | | | C101 | VCSATE1AJ156M | | 15μF 10V Tantalum,
(N.P) | AD |
| D11,
12,
13 | VHDMA132K// -1 | | Diode | AA | C103,
104 | VCSAPD1DJ474M | | 0.47μF 20V Tantalum,
(N.P) | AD |
| D14 | VHDDAN222// -1 | | Diode | AA | C106,
107 | VCSAPD1CJ105M | | 1.0μF 16V Tantalum,
(N.P) | AC |
| D15 | RH-EX0152TAZZ | | Zener Diode | | C112,
6628 | VCKYCY1EB223K | | 0.022μF 25V Ceramic | AA |
| PACKAGED CIRCUITS | | | | | C6602,
C6615 | VCKYTV1EB333K | | 0.033μF 25V Ceramic | AA |
| X11 | RCRSZ0008TAZZ | | Crystal | AR | C6603,
6616 | VCKYTV1HB153K | | 0.015μF 50V Ceramic | |
| COIL AND TRANSFORMERS | | | | | C6605,
6620 | VCKYCY1HB682K | | 0.033μF 16V Ceramic | AA |
| L14 | VPABM1R0JR82N | | Peaking 1μH 5% | AC | C6607,
6611,
6618 | VCKYTV1NF105Z | | 6800pF 50V Ceramic | AA |
| L101 | VPAEM100K1R3N | | Peaking 10μH 10% | AC | C6608,
6609,
6621,
6622 | VCKYCY1HB153K | | 1.0μF 12V Ceramic | AB |
| L6601 | VP-NM101K4R2N | | Peaking 100μH 10% | AC | C6623 | VCSAPD1AJ225M | | 0.015μF 50V Ceramic | AA |
| CAPACITORS | | | | | C6624 | VCSAPK1AJ336M | | 2.2μF 10V Tantalum,
(N.P) | AC |
| C11,
6610,
6613 | VCKYTV1EB104K | | 0.1μF 25V Ceramic | AB | C6626,
6627,
6629 | VCKYCY1EB103K | | 33μF 10V Tantalum,
(N.P) | AA |
| C15 | VCEAPE1HW105M | | 1.0μF 50V Electrolytic | AB | C6630,
6631 | VCKYCY1HB471K | | 0.01μF 25V Ceramic | |
| C16,
17 | VCKYTV1HF104Z | | 0.1μF 50V Ceramic | AA | RESISTORS | | | | |
| C18,
27,
114 | VCKYCY1EF104Z | | 0.1μF 25V Ceramic | AA | R11,
51 | VRS-CY1JF105J | | 1.0 0.063W 5% Metal
Oxide | AA |
| C19 | VCEAPE1EW335M | | 3.3μF 25V Electrolytic | AA | R17,
24 | VRS-CY1JF104J | | 100k 0.063W 5% Metal
Oxide | AA |
| C20,
22,
23,
35,
36,
45,
102,
105,
108,
109, | VCKYCY1HF103Z | | 0.01μF 50V Ceramic | | R20,
28,
6620 | VRS-CY1JF103J | | 10k 0.063W 5% Metal
Oxide | AA |
| | | | | | R22 | VRS-CY1JF224J | | 220k 0.063W 5% Metal
Oxide | AA |
| | | | | | | | | | |

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|--|-----------------|---|----------------------------|------|------------------------------------|--------------------|---|------------------|------|
| R23 | VRS - CY1JF392J | | 3.9k 0.063W 5% Metal Oxide | AA | DUNTK2437PM00 CAMERA P.W.B. | | | | |
| R25,
104 | VRS - CY1JF153J | | 15k 0.063W 5% Metal Oxide | AA | INTEGRATED CIRCUITS | | | | |
| R26,
59 | VRS - CY1JF561J | | 560 0.063W 5% Metal Oxide | AA | IC151 | VHICXA1399Q - 1 | | CXA1399Q | AT |
| R27,
54,
6601,
6611,
6626 | VRS - CY1JF102J | | 1.0k 0.063W 5% Metal Oxide | AA | IC152 | VHICA1507BR - 1 | | CXA1507BR | BE |
| R48 | VRS - CY1JF222J | | 2.2k 0.063W 5% Metal Oxide | AA | IC201 | RH - iX0171TAZZ | | HG51B143FB | BL |
| R52 | VRS - CA1JF102J | | 1.0k 0.063W 5% Metal Oxide | AA | IC202 | VHITCVHC04S - 1 | | TC74VHC04FS | |
| R101 | VRS - CY1JF153F | | 15k 0.063W 1% Metal Oxide | AA | IC231 | RH - iX0210TAZZ | | I.C. | |
| R102 | VRS - CY1JF244F | | 240k 0.063W 1% Metal Oxide | AA | IC241 | VHICXD1177Q - 1 | | CXD1177Q | AS |
| R105 | VRS - CA1JF153J | | 15k 0.063W 5% Metal Oxide | | IC271 | RH - iX0172TAZZ | | LR38183 | |
| R108 | VRS - CY1JF225J | | 2.2 0.063W 5% Metal Oxide | AA | IC272 | RH - iX0190TAZZ | | I.C. | |
| R109 | VRS - CY1JF272J | | 2.7k 0.063W 5% Metal Oxide | AA | IC273 | VHICK48324R - 1 | | CXK48324R | |
| R110 | VRS - CY1JF223J | | 22k 0.063W 5% Metal Oxide | AA | IC275 | VHIMB8115011E | | MB81C1501PF | BB |
| R6604,
6614 | VRS - CY1JF113J | | 11k 0.063W 5% Metal Oxide | AA | IC276 | VHIL7A1208 / - 1 | | I.C. | |
| R6606,
6616 | VRS - CY1JF563J | | 56k 0.063W 5% Metal Oxide | AA | IC501 | RH - iX0186TAZZ | | BR24C02F | |
| R6607,
6617 | VRS - CY1JF393J | | 39k 0.063W 5% Metal Oxide | AA | IC502 | VHIBR24C02F - 1 | | MB88346BPFV | AN |
| R6608,
6618 | VRS - CY1JF123J | | 12k 0.063W 5% Metal Oxide | AA | IC503 | VHIMB8346BV - 1 | | IC-PST592IMT | AE |
| R6609 | VRS - CA1JF682J | | 6.8k 0.063W 5% Metal Oxide | AA | IC504 | VHIPST592IM - 1 | | TC74HCT7007AF | AD |
| R6619 | VRS - CY1JF824J | | 820k 0.063W 5% Metal Oxide | AA | IC505 | VHITCHT707F - 1 | | NJM79L09UD | AE |
| R6622 | VRS - CA1JF154J | | 150k 0.063W 5% Metal Oxide | | IC506 | VHINJM79L091E | | | |
| R6624 | VRS - CY1JF154J | | 150k 0.063W 5% Metal Oxide | AA | TRANSISTORS | | | | |
| R6625 | VRS - CY1JF473J | | 47k 0.063W 5% Metal Oxide | AA | Q151 | VS2SA1774F / - 1 | | Transistor | AA |
| MISCELLANEOUS PARTS | | | | | Q152,
244,
501 | VS2SC4617B / - 1 | | Transistor | AA |
| FB11,
12,
13,
14,
15,
16,
17 | RBLN - 0059CEZZ | | Balun | AB | Q204 | VS2SK94 - X3 / - 1 | | Transistor | AC |
| FB18 | RBLN - 0062CEZZ | | Balun | AC | Q205,
246 | VSUMX2 / / / / - 1 | | Transistor | AB |
| FB6601,
6602 | RBLN - 0067CEZZ | | Balun | AC | Q242,
243 | VSUMZ1 / / / / - 1 | | Transistor | AB |
| P3 | QCNCM3652TAZZ | | Connector | AF | Q245 | VS2SB1132Q / - 1 | | Transistor | AC |
| P6601,
6602 | QPLGN0363TAZZ | | Plug | AC | DIODES AND LED'S | | | | |
| SC2 | QSOCN1747TAZZ | | Socket | AE | D501 | VHDQAP222 / / - 1 | | Diode | AA |
| | | | | | D502 | VHDMA132K / / - 1 | | Diode | AA |
| | | | | | PACKAGED CIRCUITS | | | | |
| | | | | | X202 | RCSRZ0005TAZZ | | Crystal | AU |
| | | | | | COIL AND TRANSFORMERS | | | | |
| | | | | | CF501 | RFILC0052TAZZ | | Filter | AE |
| | | | | | FL202,
203 | RFILN0079CEZZ | | Filter | AC |
| | | | | | L206 | VP - 1M220K2R9N | | Peaking 22μH 10% | AC |
| | | | | | L242,
243,
501,
502 | VPAEM100K1R3N | | Peaking 10μH 10% | AC |
| | | | | | L244 | VPAEM680K6R9N | | Peaking 68μH 10% | AC |

★ MARK: SPARE PARTS DELIVERY SECTION

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|--|---------------|---|------------------------------|------|--|--------------------------------|---|---|----------|
| CAPACITORS | | | | | C232,
243,
275,
276,
278,
282,
287,
294,
501 | VCSATA1AJ106M | | 10μF 10V Tantalum,
(N.P) | |
| C150,
156,
157,
158,
160,
165,
168,
169,
217,
219,
245,
254,
503,
504,
505,
512,
513,
515 | VCKYCY1HF103Z | | 0.01μF 50V Ceramic | AA | C167,
251,
256,
509 | VCCCCY1HH150J | | 15pF 50V Ceramic | AA |
| C151,
255 | VCSATE1AJ156M | | 15μF 10V Tantalum,
(N.P) | AD | C212,
231,
241,
502,
507 | VCKYCY1EF104Z | | 0.1μF 25V Ceramic | AA |
| C152,
154,
161,
162,
201,
203,
209,
233,
234,
235,
242,
244,
261,
262,
263,
264,
265,
266,
271,
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277,
279,
280,
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292,
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508,
511 | VCKYCY1CF104Z | | 0.1μF 16V Ceramic | AA | C213,
214 | VCKYCY1HB102K | | 1000pF 50V Ceramic | AA |
| C155,
159,
202 | VCSATA1AJ475M | | 4.7μF 10V Tantalum,
(N.P) | AC | C218
C246 | VCKYTV1EB104K
VCSATA0JJ156M | | 0.1μF 25V Ceramic
15μF 6.3V Tantalum,
(N.P) | AB |
| C163 | VCSAPD1CJ105M | | 1.0μF 16V Tantalum,
(N.P) | AC | C247,
253,
257,
293 | VCCCCY1HH100D | | 10pF 50V Ceramic | AA |
| C166,
211,
220, | VCSATA1AJ106M | | 10μF 10V Tantalum,
(N.P) | | C250
C252,
260 | VCCCCY1HH101J
VCKYTV1CF105Z | | 100pF 50V Ceramic
1.0μF 16V Ceramic | AA
AB |
| | | | | | C258
C291 | VCCCCY1HH470J
VCSATC1AJ226M | | 47pF 50V Ceramic
22μF 10V Tantalum,
(N.P) | AA
AE |
| | | | | | C506 | VCEAPE0JW106M | | 10μF 6.3V Electrolytic | AB |
| | | | | | RESISTORS | | | | |
| | | | | | R152,
253,
254,
257,
262 | VRS - CY1JF152J | | 1.5k 0.063W 5% Metal
Oxide | AA |
| | | | | | R153 | VRS - CY1JF470J | | 47 0.063W 5% Metal
Oxide | AA |
| | | | | | R157,
224 | VRS - CY1JF272J | | 2.7k 0.063W 5% Metal
Oxide | AA |
| | | | | | R158,
293,
504,
520,
1217 | VRS - CY1JF101J | | 100 0.063W 5% Metal
Oxide | AA |
| | | | | | R162,
237,
239,
503,
522 | VRS - CA1JF102J | | 1.0k 0.063W 5% Metal
Oxide | AA |
| | | | | | R163 | VRS - CA1JF220J | | 22 0.063W 5% Metal
Oxide | AA |
| | | | | | R167,
1246 | VRS - CY1JF822J | | 8.2k 0.063W 5% Metal
Oxide | AA |
| | | | | | R200,
236,
240,
531,
1202, | VRS - CY1JF000J | | 00 0.063W 5% Metal
Oxide | AA |

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|---|-----------------|---|-------------------------------|------|---|------------------------------------|---|------------------------------------|----------|
| R1209,
1210,
1251 | VRS - CY1JF000J | | 00 0.063W 5% Metal
Oxide | AA | R1203 | VRS - CY1JF273J | | 27k 0.063W 5% Metal
Oxide | AA |
| R211,
248,
274,
278,
279,
282,
284,
285,
288,
289,
501,
502,
515,
517,
524,
525,
546,
1243 | VRS - CY1JF103J | | 10k 0.063W 5% Metal
Oxide | AA | R1204 | VRS - CA1JF103J | | 10k 0.063W 5% Metal
Oxide | AA |
| | | | | | R1205 | VRS - CA1JF152J | | 1.5k 0.063W 5% Metal
Oxide | AA |
| | | | | | R1207 | VRS - CY1JF274J | | 270k 0.063W 5% Metal
Oxide | AA |
| | | | | | R1211,
1212,
1213,
1214,
1215,
1216 | VRK - SA1JF101J | | 100 0.063W 5% Metal
Composition | AB |
| | | | | | R1244 | VRS - CY1JF471J | | 470 0.063W 5% Metal
Oxide | AA |
| | | | | | R1245 | VRS - CY1JF183J | | 18k 0.063W 5% Metal
Oxide | AA |
| | | | | | R1247 | VRS - CY1JF122J | | 1.2k 0.063W 5% Metal
Oxide | AA |
| R220,
251,
252,
263,
514,
538,
539,
1208,
1241 | VRS - CY1JF102J | | 1.0k 0.063W 5% Metal
Oxide | AA | R1248 | VRS - CY1JF392J | | 3.9k 0.063W 5% Metal
Oxide | AA |
| | | | | | MISCELLANEOUS PARTS | | | | |
| R222 | VRS - CY1JF331J | | 330 0.063W 5% Metal
Oxide | AA | FB151,
203 | PSLDM3155TAFW
RBLN - 0006TAZZ | | Shield
Balun | AF
AB |
| R238 | VRS - CA1JF124J | | 120k 0.063W 5% Metal
Oxide | AA | FB152,
201,
202,
243,
244,
271,
272 | RBLN - 0007TAZZ | | Balun | |
| R241,
249,
250 | VRS - CY1JF473J | | 47k 0.063W 5% Metal
Oxide | AA | FB204,
205,
206,
245 | RBLN - 0067CEZZ | | Balun | AC |
| R242 | VRS - CY1JF393J | | 39k 0.063W 5% Metal
Oxide | AA | FB241,
242 | RBLN - 0059CEZZ | | Balun | AB |
| R243,
244 | VRS - CY1JF201J | | 200 0.063W 5% Metal
Oxide | AA | J201 | QJAKE0045TAZZ | | Jack | AD |
| R245,
246 | VRS - CY1JF104J | | 100k 0.063W 5% Metal
Oxide | AA | P11 | QCNCM2648TAZZ | | Connector | AE |
| R247,
255 | VRS - CY1JF332J | | 3.3k 0.063W 5% Metal
Oxide | AA | SC7 | QCNCW3652TAZZ | | Connector | AF |
| R256 | VRS - CY1JF105J | | 1.0 0.063W 5% Metal
Oxide | AA | SC8 | QSOCN1648TAZZ | | Socket | AE |
| R258,
259 | VRS - CY1JF182J | | 1.8k 0.063W 5% Metal
Oxide | AA | SC9 | QSOCN1448TAZZ | | Socket | AE |
| R260 | VRS - CY1JF472J | | 4.7k 0.063W 5% Metal
Oxide | AA | SC10 | QSOCN0336TAZZ | | Socket | |
| R264,
1250 | VRS - CY1JF561J | | 560 0.063W 5% Metal
Oxide | AA | SC12 | QSOCN2447TAZZ | | Socket | |
| R294,
513,
516,
529,
1242 | VRS - CY1JF223J | | 22k 0.063W 5% Metal
Oxide | AA | SC13 | QSOCN0738TAZZ | | Socket | |
| | | | | | DUNTK2438PM00 LENS DRIVE P.W.B. | | | | |
| R518 | VRS - CA1JF101J | | 100 0.063W 5% Metal
Oxide | AA | INTEGRATED CIRCUITS | | | | |
| R526,
1206 | VRS - CY1JF222J | | 2.2k 0.063W 5% Metal
Oxide | AA | IC551,
552 | VH1NJM2902V - 1 | | NJM2902V | AD |
| R527 | VRS - CA1JF223J | | 22k 0.063W 5% Metal
Oxide | AA | IC553,
IC554 | VH1MM1179XF - 1
VH1MM1247XF - 1 | | I.C.
I.C. | AK |
| R547 | VRS - CY1JF244F | | 240k 0.063W 1% Metal
Oxide | AA | | | | | |
| R548 | VRS - CY1JF153F | | 15k 0.063W 1% Metal
Oxide | AA | | | | | |

★ MARK: SPARE PARTS DELIVERY SECTION

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|---|-----------------|---|------------------------------|------|---------------------------------|------------------|---|----------------------------|------|
| TRANSISTORS | | | | | R564 | VRS - CY1JF180J | | 18 0.063W 5% Metal Oxide | AA |
| Q551 | VS2SC4617B/-1 | | Transistor | AA | R565 | VRS - CY1JF103J | | 10k 0.063W 5% Metal Oxide | AA |
| Q552 | VSUMT2/////-1 | | Transistor | AB | R566 | VRS - CA1JF121J | | 120 0.063W 5% Metal Oxide | |
| Q553, 554 | VS2SB1132Q/-1 | | Transistor | AC | R567 | VRS - CY1JF222J | | 2.2k 0.063W 5% Metal Oxide | AA |
| Q555, 556, 557 | VSUMG2/////-1 | | Transistor | AC | R568 | VRS - CA1JF682J | | 6.8k 0.063W 5% Metal Oxide | AA |
| CAPACITORS | | | | | R569 | VRS - CA1JF124J | | 120k 0.063W 5% Metal Oxide | AA |
| C551, 564, 573, 578 | VCKYCY1CF104Z | | 0.1μF 16V Ceramic | AA | R570 | VRS - CA1JF123J | | 12k 0.063W 5% Metal Oxide | |
| C552, 553 | VCSATA1AJ475M | | 4.7μF 10V Tantalum, (N.P) | AC | R571, 575 | VRS - CY1JF912J | | 9.1k 0.063W 5% Metal Oxide | AA |
| C554 | VCKYCY1HB122K | | 1200pF 50V Ceramic | AA | R572, 576 | VRS - CY1JF562J | | 5.6k 0.063W 5% Metal Oxide | AA |
| C555, 556 | VCCCCY1HH121J | | 120pF 50V Ceramic | AA | R573, 577 | VRS - CY1JF821J | | 820 0.063W 5% Metal Oxide | AA |
| C557 | VCKYCY1HB272K | | 2700pF 50V Ceramic | AA | R574, 596 | VRS - CY1JF391J | | 390 0.063W 5% Metal Oxide | AA |
| C558, 560, 561, 572 | VCKYCY1HF103Z | | 0.01μF 50V Ceramic | AA | R580 | VRS - CY1JF000J | | 00 0.063W 5% Metal Oxide | AA |
| C559 | VCKYCY1CF224Z | | 0.22μF 16V Ceramic | AA | MISCELLANEOUS PARTS | | | | |
| C562, 563 | VCKYCY1CB333K | | 0.033μF 16V Ceramic | AA | SC14 | QSOCN2447TAZZ | | Socket | |
| C565, 574 | VCSATE1AJ156M | | 15μF 10V Tantalum, (N.P) | AD | SC15 | QSOCN2247TAZZ | | Socket | AF |
| C566, 567, 568, 569, 570, 571, 581, 582 | VCKYCY1CB473K | | 0.047μF 16V Ceramic | AA | DSEDU0288KE00 VCR P.W.B. | | | | |
| C579, 580 | VCCCCY1HH560J | | 56pF 50V Ceramic | AA | INTEGRATED CIRCUITS | | | | |
| RESISTORS | | | | | IC301 | VH i HA118167-1 | | HA118167F I.C. | AR |
| R551, 555 | VRS - CA1JF103J | | 10k 0.063W 5% Metal Oxide | AA | IC701 | RH - i X0214TAZZ | | S-8420HF | AL |
| R552, 556 | VRS - CY1JF124J | | 120k 0.063W 5% Metal Oxide | AA | IC702 | VH i S8420HF/-1 | | S-2917IF10 | |
| R553 | VRS - CA1JF472J | | 4.7k 0.063W 5% Metal Oxide | AA | IC703 | VH i S2917IF/-1 | | UPD6461GS-614 | AQ |
| R554, 557 | VRS - CA1JF223J | | 22k 0.063W 5% Metal Oxide | AA | IC704 | RH - i X0194TAZZ | | MB3785APFV | AH |
| R558 | VRS - CY1JF682J | | 6.8k 0.063W 5% Metal Oxide | AA | IC900 | VH i MB3785V/-1 | | MB3775PFV | |
| R559 | VRS - CY1JF225J | | 2.2ohm 0.063W 5% Metal Oxide | AA | IC901 | VH i MB3775FV/-1 | | I.C. | |
| R560 | VRS - CA1JF333J | | 33k 0.063W 5% Metal Oxide | | IC1701 | RH - i X0198TAZZ | | I.C. | |
| R561 | VRS - CY1JF393J | | 39k 0.063W 5% Metal Oxide | AA | IC1702 | VH i XR10823/-1 | | I.C. | |
| R562, 563 | VRS - CA1JF392J | | 3.9k 0.063W 5% Metal Oxide | AA | IC1703 | VH i XR10358F/-1 | | XRA10358F-T1 | AC |
| TRANSISTORS | | | | | IC1704 | VH i LB1841V/-1 | | LB1841V | AM |
| | | | | | IC1705 | VH i LB1881V/-1 | | LB1881V | AM |
| | | | | | IC1706 | VH i LB1880B/-1 | | I.C. | |
| | | | | | IC1707 | VH i NJM2902V/-1 | | NJM2902V | AD |
| | | | | | IC1708 | VH i SC7S04F/-1 | | SC7S04F | |
| | | | | | IC3401 | VH i TA75S393-1 | | I.C. | |
| | | | | | IC3402 | VH i CA1509AR-1 | | I.C. | |
| | | | | | TRANSISTORS | | | | |
| | | | | | Q301, 3411, 3420 | VSDTA114EE/-1 | | Transistor | AB |
| | | | | | Q302, 303, | VSXP6501///-1 | | Transistor | AB |

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| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|--|-----------------|---|-------------------------------|------|---|-----------------|---|------------------------------|------|
| C718,
721 | VCSATA1AJ475M | | 4.7μF 10V Tantalum,
(N.P) | AC | C1786,
3463 | VCCCCY1HH101J | | 100pF 50V Ceramic | AA |
| C724 | VCSATA0JJ475M | | 4.7μF 6.3V Tantalum,
(N.P) | AC | C1702 | VCCCCY1HH270J | | 27pF 50V Ceramic | AA |
| C903,
1788 | VCKYCY1HB472K | | 4700pF 50V Ceramic | AA | C1708,
1709,
9907 | VCKYCY1HB471K | | 470pF 50V Ceramic | AA |
| C905,
910,
948,
1714,
1719,
1780,
9904,
9905,
9910,
9911,
9912 | VCKYTV1EB104K | | 0.1μF 25V Ceramic | AB | C1712 | VCKYCY1HB222K | | 2200pF 50V Ceramic | AA |
| | | | | | C1718 | VCKYCY1HB682K | | 6800pF 50V Ceramic | AA |
| | | | | | C1727 | VCKYTV1HB473K | | 0.047μF 50V Ceramic | AA |
| | | | | | C1729,
1730,
1731,
3400 | VCKYCY1HB103K | | 0.01μF 50V Ceramic | AA |
| C906,
907,
3460 | VCCCCY1HH471J | | 470pF 50V Ceramic | AA | C1737,
1738,
3422,
3432 | VCCCCY1HH150J | | 15pF 50V Ceramic | AA |
| C908 | VCCCCY1HH331J | | 330pF 50V Ceramic | AA | C1743 | VCKYTV1CB224K | | 0.22μF 16V Ceramic | AB |
| C909 | VCKYTV1CF104Z | | 0.1μF 16V Ceramic | AA | C1744 | VCKYTV1EB273K | | 0.027μF 25V Ceramic | AA |
| C911,
1728,
3439,
3441 | VCKYCY1CB473K | | 0.047μF 16V Ceramic | AA | C1745,
1747 | VCSATE1CJ106M | | 10μF 16V Tantalum,
(N.P) | AD |
| C918 | VCKYCY1HB331K | | 330pF 50V Ceramic | AA | C1754 | VCSATA1CJ335M | | 3.3μF 16V Tantalum,
(N.P) | AC |
| C922,
925,
926,
928,
929,
937,
941,
949,
951 | RC - CZ0008TAZZ | | Capacitor | AE | C1756,
1757,
1758 | VCKYCY1HF333Z | | 0.033μF 50V Ceramic | AA |
| C927 | VCKYCY1HB271K | | 270pF 50V Ceramic | AA | C1759 | VCKYTV1CF225Z | | 2.2μF 16V Ceramic | AC |
| C938,
943,
9909 | RC - CZ0012TAZZ | | Capacitor | AE | C1782 | VCKYTV1EB683K | | 0.068μF 25V Ceramic | AB |
| C939,
940,
944,
1790 | VCKYTV1EF104Z | | 0.1μF 25V Ceramic | AB | C1787 | VCKYCY1HB332K | | 3300pF 50V Ceramic | AA |
| C953,
1741,
1746,
1753,
3416 | VCKYTV1CF105Z | | 1.0μF 16V Ceramic | AB | C1789 | VCKYTV1HF104Z | | 0.1μF 50V Ceramic | AA |
| C960,
3443 | VCCCCY1HH221J | | 220pF 50V Ceramic | AA | C3402 | VCCCCY1HH820J | | 82pF 50V Ceramic | AA |
| C990 | VCEAPT1CN226M | | 22μF 16V Electrolytic | AC | C3404,
3450,
3451 | VCCCCY1HH680J | | 68pF 50V Ceramic | AA |
| C996,
1705 | VCKYCY1HB152K | | 1500pF 50V Ceramic | AA | C3406 | VCKYCY1HB562K | | 5600pF 50V Ceramic | AA |
| C1301,
1711,
1734,
1742,
1750,
1751,
1755,
3426,
3462,
3486 | VCKYCY1EF104Z | | 0.1μF 25V Ceramic | AA | C3407,
3419,
3431,
3466 | VCCCCY1HH330J | | 33pF 50V Ceramic | AA |
| C1302 | VCCCCY1HH151J | | 150pF 50V Ceramic | AA | C3408 | VCSATE1AJ226M | | 22μF 10V Tantalum,
(N.P) | AA |
| C1303,
1304,
1785 | VCCCCY1HH101J | | 100pF 50V Ceramic | AA | C3427,
3434,
3475 | VCKYCY1EB223K | | 0.022μF 25V Ceramic | AA |
| RESISTORS | | | | | | | | | |
| | | | | | R301,
302,
303,
304,
3425,
3438,
3468 | VRS - CY1JF183J | | 18k 0.063W 5% Metal
Oxide | AA |
| | | | | | R305 | VRS - CY1JF181J | | 180 0.063W 5% Metal
Oxide | AA |

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|---|-----------------|---|-------------------------------|------|---|-----------------|---|-------------------------------|------|
| R306,
313,
314,
317,
318,
3403,
3408,
3443,
3463 | VRS - CY1JF331J | | 330 0.063W 5% Metal
Oxide | AA | R1709,
1711,
1714,
1715,
1727,
1728,
1792,
3406,
3459,
3460 | VRS - CY1JF223J | | 22k 0.063W 5% Metal
Oxide | AA |
| R307,
326,
710,
712,
713,
738,
750,
751,
752,
753,
754,
1718,
1746,
1751,
1767,
1783,
1784,
1789,
1791,
1794,
1797,
3404,
3440,
3448,
3449,
3450,
3451,
3455,
3464,
3471 | VRS - CY1JF102J | | 1.0k 0.063W 5% Metal
Oxide | AA | R322,
332,
333,
334,
336,
337,
343,
931,
952,
1743,
3480 | VRS - CY1JF562J | | 5.6k 0.063W 5% Metal
Oxide | AA |
| R308,
3441,
3495,
3496 | VRS - CY1JF101J | | 100 0.063W 5% Metal
Oxide | AA | R323,
711,
716,
719,
721,
724,
729,
730,
734,
735,
923,
993,
1706,
1717,
1720,
1722,
1769,
1772,
1776,
1777,
1778,
3429,
3473 | VRS - CY1JF103J | | 10k 0.063W 5% Metal
Oxide | AA |
| R309,
315,
321,
324,
1305,
3452,
3494 | VRS - CY1JF221J | | 220 0.063W 5% Metal
Oxide | AA | R325,
327,
328,
329,
330,
1757,
3433,
3472,
3476 | VRS - CY1JF222J | | 2.2k 0.063W 5% Metal
Oxide | AA |
| R310 | VRS - CY1JF100F | | 10 0.063W 1% Metal
Oxide | AA | R338 | VRS - CA1JF563J | | 56k 0.063W 5% Metal
Oxide | |
| R311,
312,
319,
320,
914,
919,
943,
1756,
3415,
3481,
3488 | VRS - CY1JF332J | | 3.3k 0.063W 5% Metal
Oxide | AA | R340,
969,
3432 | VRS - CY1JF563J | | 56k 0.063W 5% Metal
Oxide | AA |
| R316,
335,
1306,
1308,
1707, | VRS - CY1JF223J | | 22k 0.063W 5% Metal
Oxide | AA | R341,
3482 | VRS - CY1JF154J | | 150k 0.063W 5% Metal
Oxide | AA |
| | | | | | R342,
1763,
1764,
1765,
1766,
3412,
3462 | VRS - CY1JF471J | | 470 0.063W 5% Metal
Oxide | AA |

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|---|-----------------|---|----------------------------|------|--|-----------------|---|-----------------------------|------|
| R701 | VRS - CY1JF243J | | 24k 0.063W 5% Metal Oxide | AA | R1731, 1735, 9902 | VRS - CY1JF823J | | 82k 0.063W 5% Metal Oxide | AA |
| R702, 1716 | VRS - CY1JF123J | | 12k 0.063W 5% Metal Oxide | AA | R739, 937, 3401, 3424, 3431 | VRS - CY1JF153J | | 15k 0.063W 5% Metal Oxide | AA |
| R703, 968, 1740, 9901 | VRS - CY1JF473J | | 47k 0.063W 5% Metal Oxide | AA | R740 | VRS - CA1JF153J | | 15k 0.063W 5% Metal Oxide | |
| R704, 714, 9912 | VRS - CY1JF334J | | 330k 0.063W 5% Metal Oxide | AA | R743, 1713, 3426, 3434, 3437, 3461, 3492 | VRS - CY1JF272J | | 2.7k 0.063W 5% Metal Oxide | AA |
| R705, 994, 1710 | VRS - CY1JF472J | | 4.7k 0.063W 5% Metal Oxide | AA | R744 | VRS - CA1JF272J | | 2.7k 0.063W 5% Metal Oxide | |
| R706, 1721, 3466 | VRS - CY1JF122J | | 1.2k 0.063W 5% Metal Oxide | AA | R902, 904, 907, 908 | VRN - CY1JF472D | | 4.7k 0.063W 0.5% Metal Film | AA |
| R707, 1701, 1796, 3411, 3491 | VRS - CY1JF000J | | 00 0.063W 5% Metal Oxide | AA | R905, 996, 1781, 3439 | VRS - CY1JF273J | | 27k 0.063W 5% Metal Oxide | AA |
| R708, 1702 | VRS - CA1JF102J | | 1.0k 0.063W 5% Metal Oxide | AA | R909, 970, 1704, 1705 | VRS - CY1JF105J | | 1.0 0.063W 5% Metal Oxide | AA |
| R715, 732, 903, 1723, 1724, 1793, 1795, 1799, 9909 | VRS - CY1JF104J | | 100k 0.063W 5% Metal Oxide | AA | R910, 1780, 3487 | VRS - CY1JF682J | | 6.8k 0.063W 5% Metal Oxide | AA |
| R717, 722, 725, 1703, 1770, 1771 | VRS - CA1JF103J | | 10k 0.063W 5% Metal Oxide | AA | R916, 9913 | VRS - TV1JD271J | | 270 0.063W 5% Metal Oxide | AA |
| R720, 3400 | VRS - CY1JF822J | | 8.2k 0.063W 5% Metal Oxide | AA | R917, 941, 991 | VRS - TV1JD471J | | 470 0.063W 5% Metal Oxide | AA |
| R731, 911, 912, 915, 920, 936, 986, 997, 1307, 3407, 3483, 9904, 9905, 9908, 9910 | VRS - CY1JF333J | | 33k 0.063W 5% Metal Oxide | AA | R918 | VRS - TV1JD221J | | 220 0.063W 5% Metal Oxide | AA |
| R733, 3405, 3410, 3435, 3457, 3465, 3489 | VRS - CY1JF152J | | 1.5k 0.063W 5% Metal Oxide | AA | R921, 938, 3474, 3475, 3490 | VRS - CY1JF392J | | 3.9k 0.063W 5% Metal Oxide | AA |
| R736, 948, 1768 | VRS - CY1JF474J | | 470k 0.063W 5% Metal Oxide | AA | R924 | VRS - TV1JD102J | | 1.0k 0.063W 5% Metal Oxide | AA |
| R737, 1719 | VRS - CY1JF823J | | 82k 0.063W 5% Metal Oxide | AA | R930, 3402, 3414, 3453 | VRS - CY1JF681J | | 680 0.063W 5% Metal Oxide | AA |
| | | | | | R932, 3423, 3428, 3467 | VRS - CY1JF182J | | 1.8k 0.063W 5% Metal Oxide | AA |
| | | | | | R934 | VRN - CY1JF223D | | 22k 0.063W 0.5% Metal Film | AA |
| | | | | | R935 | VRN - CY1JF752D | | 7.5k 0.063W 0.5% Metal Film | AA |
| | | | | | R939 | VRS - TV1JD2R2J | | 2.2 0.063W 5% Metal Oxide | AA |
| | | | | | R940 | VRS - TV1JD821J | | 820 0.063W 5% Metal Oxide | AA |
| | | | | | R942 | VRS - CY1JF303F | | 30k 0.063W 1% Metal Oxide | AA |
| | | | | | R944 | VRS - CY1JF682F | | 6.8k 0.063W 1% Metal Oxide | AA |

★ MARK: SPARE PARTS DELIVERY SECTION

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|---|-----------------|---|-----------------------------|------|---------------------------------|------------------|---|----------------------------|------|
| R945 | VRS - CY1JF273F | | 27k 0.063W 1% Metal Oxide | AA | R9903 | VRS - CY1JF752J | | 7.5k 0.063W 5% Metal Oxide | AA |
| R946 | VRS - TV1JD681J | | 680 0.063W 5% Metal Oxide | AA | R9906, 9914 | VRS - CY1JF103F | | 10k 0.063W 1% Metal Oxide | AA |
| R949 | VRS - CY1JF824J | | 820k 0.063W 5% Metal Oxide | AA | R9907 | VRS - CY1JF122F | | 1.2k 0.063W 1% Metal Oxide | AA |
| R950 | VRN - CY1JF153D | | 15k 0.063W 0.5% Metal Film | AA | R9911 | VRS - CY1JF124J | | 120k 0.063W 5% Metal Oxide | AA |
| R951 | VRN - CY1JF912D | | 9.1k 0.063W 0.5% Metal Film | AA | R9915 | VRS - CY1JF392F | | 3.9k 0.063W 1% Metal Oxide | AA |
| R955 | VRS - CY1JF272F | | 2.7k 0.063W 1% Metal Oxide | AA | R9916, 9917 | VRN - CY1JF333D | | 33k 0.063W 0.5% Metal Film | |
| R956, 1708, 1739 | VRS - CY1JF683J | | 68k 0.063W 5% Metal Oxide | AA | MISCELLANEOUS PARTS | | | | |
| R1301 | VRS - CY1JF330J | | 33 0.063W 5% Metal Oxide | AA | FB900 | RBLN - 0009TAZZ | | Balun | AB |
| R1302 | VRS - CY1JF560J | | 56 0.063W 5% Metal Oxide | AA | △ F901, △ 902 | QFS - L1621TAZZ | | Fuse | AE |
| R1303, 3409, 3427, 3442, 3456, 3458, 3493 | VRS - CY1JF561J | | 560 0.063W 5% Metal Oxide | AA | △ F903 | QFS - L1021TAZZ | | Fuse | AE |
| R1304, 3454 | VRS - CY1JF271J | | 270 0.063W 5% Metal Oxide | AA | P27, 28, 33 | QPLGN0263TAZZ | | Plug | AB |
| R1712, 1787 | VRS - CY1JF394J | | 390k 0.063W 5% Metal Oxide | AA | P35 | QCNCM1652TAZZ | | Connector | AD |
| R1725, 1726 | VRS - CY1JF201J | | 200 0.063W 5% Metal Oxide | AA | P36 | QPLGN0463TAZZ | | Plug | AC |
| R1732, 1737 | VRS - CY1JF202J | | 2.0k 0.063W 5% Metal Oxide | AA | SC23, 34 | QSOCN1648TAZZ | | Socket | AE |
| R1734 | VRS - CY1JF564J | | 560k 0.063W 5% Metal Oxide | AA | SC24 | QSOCN1448TAZZ | | Socket | AE |
| R1742, 1744, 1745, 1749, 1762, 1788 | VRS - CY1JF393J | | 39k 0.063W 5% Metal Oxide | AA | SC25 | QSOCN0638TAZZ | | Socket | AD |
| R1747 | VRS - CY1JF513J | | 51k 0.063W 5% Metal Oxide | AA | SC26 | QSOCN0361TAZZ | | Socket | AD |
| R1750, 3430, 3469, 3478 | VRS - CY1JF821J | | 820 0.063W 5% Metal Oxide | AA | SC29 | QSOCN1247TAZZ | | Socket | AE |
| R1752, 1753 | VRS - TQ2BD1R0J | | 1.0 1/8W 5% Metal Oxide | AA | SC30 | QSOCN1847TAZZ | | Socket | AE |
| R1758, 1759, 1760 | VRS - CY1JF2R2J | | 2.2 0.063W 5% Metal Oxide | AA | SC31 | QSOCN1747TAZZ | | Socket | AE |
| R1773 | VRS - TV1JD561J | | 560 0.063W 5% Metal Oxide | AA | SC32 | QSOCN0647TAZZ | | Socket | AE |
| R1774, 1775 | VRS - TV1JD1R0J | | 1.0 0.063W 5% Metal Oxide | AA | DSETU0288KE00 LCD P.W.B. | | | | |
| R1779 | VRS - CY1JF680J | | 68 0.063W 5% Metal Oxide | AA | INTEGRATED CIRCUITS | | | | |
| R1782 | VRS - CY1JF184J | | 180k 0.063W 5% Metal Oxide | AA | IC401 | VHICXA1810R - 1 | | I.C. | AE |
| R3436 | VRS - CY1JF121J | | 120 0.063W 5% Metal Oxide | AA | IC402, 1403 | VHITC4W53F / - 1 | | TC4W53F | |
| R3470, 3477, 9918 | VRS - CY1JF391J | | 390 0.063W 5% Metal Oxide | AA | IC403, 404 | VHICXL1506N - 1 | | CXL1506N | |
| R7801 | VRS - TV1JD103J | | 10k 0.063W 5% Metal Oxide | AA | IC405 | VHIBA7655AF - 1 | | BA7655AF | |
| | | | | | IC406 | VHICXA1211M - 1 | | CXA1211M | AH |
| | | | | | IC601 | VHITC4W66F / - 1 | | TC4W66F | AE |
| | | | | | IC602, 803 | VHINJM2107F - 1 | | NJM2107F | AE |
| | | | | | IC603 | VHHA118276 - 1 | | HA118276F | AW |
| | | | | | IC800 | VHIR3Y21 / - 1 | | I.C. | AU |
| | | | | | IC801 | RH - IX2089CEZZ | | LZ93N82 | AR |
| | | | | | IC804 | VHINJM2904M - 1 | | NJM2904M | AE |
| | | | | | IC1401 | VHIMC13400F - 1 | | MC13400FU | AN |
| | | | | | IC1402 | VHINJM2244M - 1 | | NJM2244M | AG |
| | | | | | IC2401 | VHIM52358VP - 1 | | M52358VP | AS |
| | | | | | IC5401, 5403 | VHIMB8346BV - 1 | | MB88346BPFV | AN |
| | | | | | IC5402 | VHIM62353GP - 1 | | M62353GP | AN |
| | | | | | IC6401 | VHINJM4560M - 1 | | NJM4560M | AG |
| | | | | | IC6402 | VHIM5222FP / - 1 | | M5222FP | AG |
| | | | | | IC6403 | VHITDA7052A - 1 | | TDA7052AT | AK |

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|--------------------|-------------------|---|-------------|------|------------------------------|---------------------|---|------------------|------|
| TRANSISTORS | | | | | Q2408 | VSXP4213 /// - 1 | | Transistor | AB |
| Q401, | VS2SC4617B / - 1 | | Transistor | AA | Q601 | VS RN4604 /// - 1 | | Transistor | AB |
| 403, | | | | | Q602, | VSDTC323TK / - 1 | | Transistor | AB |
| 404, | | | | | 603, | | | | |
| 405, | | | | | 6405, | | | | |
| 406, | | | | | 6406 | | | | |
| 407, | | | | | Q604 | V SUMT2 /// - 1 | | Transistor | AB |
| 408, | | | | | Q608 | V SUMX2 /// - 1 | | Transistor | AB |
| 410, | | | | | Q801, | VSXP4601 /// - 1 | | Transistor | AB |
| 412, | | | | | 803, | | | | |
| 414, | | | | | 804 | | | | |
| 417, | | | | | Q808 | VS2SD2216 / - 1 | | Transistor | AA |
| 423, | | | | | Q2409 | VSXP6501 /// - 1 | | Transistor | AB |
| 425, | | | | | Q6402 | VS RN2427 /// - 1 | | Transistor | |
| 428, | | | | | DIODES AND LED'S | | | | |
| 432, | | | | | D401, | VH DMA132WK / - 1 | | Diode | AA |
| 438, | | | | | 1401, | | | | |
| 446, | | | | | 2401, | | | | |
| 448, | | | | | 2402 | | | | |
| 454, | | | | | D402, | VH DMA133 /// - 1 | | Diode | AB |
| 455, | | | | | 1402, | | | | |
| 1403, | | | | | 1403, | | | | |
| 2402, | | | | | 1404, | | | | |
| 2410, | | | | | 1405, | | | | |
| 2420 | | | | | 1406 | | | | |
| Q402, | VS2SA1774F / - 1 | | Transistor | AA | D403, | VH DHVM17 - 5 / - 1 | | Diode | AD |
| 429, | | | | | 806, | | | | |
| 430, | | | | | 816, | | | | |
| 445, | | | | | 817 | | | | |
| 449, | | | | | D802 | RH - EX0626CEZZ | | Zener Diode | AB |
| 453, | | | | | D804, | VH DMA132K / - 1 | | Diode | AA |
| 1401, | | | | | 808 | | | | |
| 1405 | | | | | D805 | RH - EX0226CEZZ | | Zener Diode | AB |
| Q409, | VS RN2104 /// - 1 | | Transistor | AA | D809 | VH DMA147 /// - 1 | | Diode | AB |
| 416, | | | | | PACKAGED CIRCUITS | | | | |
| 435, | | | | | TH401, | VH HNTA20234 - 1 | | Thermistor | AC |
| 2401, | | | | | 801 | | | | |
| 2406 | | | | | X401 | R CRSC0041TAZZ | | Crystal | |
| Q411 | VS2SD602A / - 1 | | Transistor | AB | X800 | R CRSZ0011TAZZ | | Crystal | |
| Q413, | VSDTC144EE / - 1 | | Transistor | AA | COIL AND TRANSFORMERS | | | | |
| 444, | | | | | FL401 | R CILF0308TAZZ | | Coil | AF |
| 606, | | | | | FL402, | R CILF0312TAZZ | | Coil | AL |
| 814, | | | | | 403 | | | | |
| 815, | | | | | FL404 | R CILF0318TAZZ | | Coil | |
| 816, | | | | | FL405 | R CILF0319TAZZ | | Coil | |
| 1402, | | | | | FL601 | R CILF0279TAZZ | | Coil | AL |
| 1404, | | | | | FL602 | R CILF0298TAZZ | | Coil | AL |
| 6401, | | | | | FL800 | R CILF0320TAZZ | | IF Coil | AE |
| 6403 | | | | | L401, | VPABM5R6J1R9N | | Peaking 5.6μH 5% | AC |
| Q415, | VS RN1104 /// - 1 | | Transistor | AA | 402, | | | | |
| 434 | | | | | 2404 | | | | |
| Q418 | V SUMA2 /// - 1 | | Transistor | AB | L403 | VPABM101J160N | | Peaking 100μH 5% | AC |
| Q419 | V SUMG2 /// - 1 | | Transistor | AC | L404, | VPABM3R3J1R4N | | Peaking 3.3μH 5% | AC |
| Q424, | VS2SC3931C / - 1 | | Transistor | AB | | | | | |
| 433 | | | | | | | | | |
| Q437, | VS2SC4738Y / - 1 | | Transistor | AA | | | | | |
| 2403 | | | | | | | | | |
| Q439, | VSDTA144EE / - 1 | | Transistor | AA | | | | | |
| 605, | | | | | | | | | |
| 609, | | | | | | | | | |
| 813 | | | | | | | | | |
| Q441, | VS2SC4555 - 6 + 1 | | Transistor | AB | | | | | |
| 442 | | | | | | | | | |
| Q450 | VS2SA1577R / - 1 | | Transistor | AB | | | | | |
| Q451 | V SUMW1 /// - 1 | | Transistor | AB | | | | | |
| Q452, | VSXP4213 /// - 1 | | Transistor | AB | | | | | |
| 2407, | | | | | | | | | |

13-14

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|---|---------------|---|------------------------|------|---|--|---|--|--|
| C812,
819,
825,
827,
843,
872,
876,
893,
1402,
1404,
1406,
1408,
1416,
1420,
2402,
2420,
2421,
2422,
2423,
2424,
2427,
2429,
2452,
4401,
4404,
4412,
4413,
4415,
4416,
4417,
4421,
4422,
6411 | VCKYCY1HF103Z | | 0.01μF 50V Ceramic | AA | C4400,
5402,
5403,
5404,
C429,
449,
C431,
447,
450,
478,
486,
487,
493,
1409,
4405,
C433,
864,
2426,
C435,
498,
C451,
877,
C459,
C464,
865,
874,
C465,
C466,
646,
660,
678,
1411 | VCKYCY1CF104Z

VCSAPD0JJ335M
VCSATA1AJ106M

VCCCCY1HH680J

VCCCCY1HH820J
VCCCCY1HH330J
VCE9PF1AW106M
VCCCCY1HH560J

VCCCCY1HH271J
VCSATA0JJ475M | | 0.1μF 16V Ceramic

3.3μF 6.3V Tantalum,
(N.P)
10μF 10V Tantalum,
(N.P)

68pF 50V Ceramic

82pF 50V Ceramic
33pF 50V Ceramic
10μF 10V Electrolytic,
(N.P)
56pF 50V Ceramic

270pF 50V Ceramic
4.7μF 6.3V Tantalum,
(N.P) | AA

AC

AA

AA
AA
AE
AA

AA
AC |
| C411,
657,
1417,
6406 | VCEAPF0JW476M | | 47μF 6.3V Electrolytic | AB | C468,
4414,
C469 | VCSATE1AJ226M
VCE9PE0GW226M | | 22μF 10V Tantalum,
(N.P)
22μF 4.0V Electrolytic,
(N.P) | AA |
| C418,
436,
473,
651,
664,
850,
5702 | VCCCCY1HH471J | | 470pF 50V Ceramic | AA | C470,
471,
821,
2425,
C479,
2412,
2417 | VCCCCY1HH151J

VCSATA1AJ475M | | 150pF 50V Ceramic

4.7μF 10V Tantalum,
(N.P) | AA
AC |
| C425,
426,
427,
428,
444,
445,
446,
448,
604,
605,
828,
835,
836,
837,
838,
841,
842,
859,
869,
870,
884,
1407,
1418,
2413, | VCKYCY1CF104Z | | 0.1μF 16V Ceramic | AA | C481,
483,
484,
499,
1401,
1403,
1412,
C482,
C488,
489,
C491,
653,
C601,
C602,
603,
617,
666,
C618,
626,
667,
866,
2428,
C621,
824 | VCKYTV1CF474Z

VCKYTV1CF224Z
VCSATA1AJ335M
VCEAPF1CW106M
VCEAPH1HW225M
VCKYTQ1CF225Z

VCCCCY1HH220J

VCKYCY1EB103K | | 0.47μF 16V Ceramic

0.22μF 16V Ceramic
3.3μF 10V Tantalum,
(N.P)
10μF 16V Electrolytic
2.2μF 50V Electrolytic
2.2μF 16V Ceramic

22pF 50V Ceramic

0.01μF 25V Ceramic | AB

AB
AC
AB
AB

AA

AA |

★ MARK: SPARE PARTS DELIVERY SECTION

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|--|--|---|---|----------------------|--|---|---|---|--|
| C623,
628,
638,
669,
2406,
2408,
4407,
4409 | VCSAPD1CJ105M | | 1.0μF 16V Tantalum,
(N.P) | AC | C1405
C834
C839
C840,
855,
857
C844 | VCEAPF0JW107M
VCEAPF1VW106M
VCEAPT0JN476M
VCEAPF1EW475M | | 100μF 6.3V Electrolytic
10μF 35V Electrolytic
47μF 6.3V Electrolytic
4.7μF 25V Electrolytic | AC
AB
AC
AB |
| C624,
879 | VCCCCY1HH101J | | 100pF 50V Ceramic | AA | C856
C868 | VCEAPT1CN226M
VCE9PF1CW475M | | 0.47μF 20V Tantalum,
(N.P)
22μF 16V Electrolytic
4.7μF 16V Electrolytic,
(N.P) | AD
AC
AC |
| C629
C630
C632
C639,
640,
647,
648,
672,
673,
679,
680,
860,
867,
883,
886,
887,
894,
2416,
2418,
4411,
4420 | VCKYCY1EF223Z
VCEAPF0JW226M
VCKYCY1HB562K
VCKYCY1HB102K | | 0.022μF 25V Ceramic
22μF 6.3V Electrolytic
5600pF 50V Ceramic
1000pF 50V Ceramic | AA
AB
AA
AA | C871
C873
C878,
2410,
2419
C880,
881,
882
C885
C888
C1410,
1414,
1415
C4406
C4408

C4418
C4419
C5401
C6415 | VCKYCY1HB681K
VCCCCY1HH150J
VCCCCY1HH390J

VCCCCY1HH181J

VCKYCY1EF104Z
VCCCCY1EH561J
VCEAPF0GW227M

VCKYCY1EB223K
VCSAPD1DJ684M

VCCCCY1HH221J
VCCCCY1HH120J
VCEAPH1CW106M
VCEAPT1CN107M | | 680pF 50V Ceramic
15pF 50V Ceramic
39pF 50V Ceramic

180pF 50V Ceramic

0.1μF 25V Ceramic
560pF 25V Ceramic
220μF 4.0V Electrolytic

0.022μF 25V Ceramic
0.68μF 20V Tantalum,
(N.P)
220pF 50V Ceramic
12pF 50V Ceramic
10μF 16V Electrolytic
100μF 16V Electrolytic | AA
AA
AA

AA

AA
AA
AB

AA
AC

AA
AA
AB
AD |
| C642,
675,
2409 | VCKYCY1HB152K | | 1500pF 50V Ceramic | AA | RESISTORS | | | | |
| C644,
658,
676,
6403,
6404,
6408 | VCEAPF0GW476M | | 47μF 4.0V Electrolytic | AB | | | | | |
| C645,
677 | VCSAPD1AJ225M | | 2.2μF 10V Tantalum,
(N.P) | AC | R401,
407,
411,
417,
422,
449,
454,
459,
461,
462,
469,
477,
629,
633,
634,
639,
825,
894,
1402,
1404,
1405,
1414,
1415,
1417,
1431,
1443,
1875,
1889,
2426,
2428,
2431, | VRS - CY1JF102J | | 1.0k 0.063W 5% Metal
Oxide | AA |
| C652,
663,
4410 | VCKYCY1HB332K | | 3300pF 50V Ceramic | AA | | | | | |
| C690,
691 | VCKYCY1HB272K | | 2700pF 50V Ceramic | AA | | | | | |
| C811,
862,
863 | VCKYCY1CF334Z | | 0.33μF 16V Ceramic | AA | | | | | |
| C813 | VCSATA0GJ106M | | 10μF 4.0V Tantalum,
(N.P) | AC | | | | | |
| C814,
817 | VCSAPD1AJ105M | | 1.0μF 10V Tantalum,
(N.P) | AD | | | | | |
| C815,
892,
1421,
5701 | VCKYTV1CF105Z | | 1.0μF 16V Ceramic | AB | | | | | |
| C816
C820 | VCKYCY1EF153Z
VCSAPD1VJ224M | | 0.015μF 25V Ceramic
0.22μF 35V Tantalum,
(N.P) | AA
AB | | | | | |
| C822,
2403 | VCCCCY1HH100D | | 10pF 50V Ceramic | AA | | | | | |
| C826,
833 | VCEAPF1CW476M | | 47μF 16V Electrolytic | AC | | | | | |
| C829,
830 | VCEAPF1AW336M | | 33μF 10V Electrolytic | AC | | | | | |
| C832, | VCEAPF0JW107M | | 100μF 6.3V Electrolytic | AC | | | | | |

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|---|-----------------|---|-------------------------------|------|---|-----------------|---|-------------------------------|------|
| R4400,
4417,
4441,
4459 | VRS - CY1JF102J | | 1.0k 0.063W 5% Metal
Oxide | AA | R1811,
2412,
4471 | VRS - CY1JF472J | | 4.7k 0.063W 5% Metal
Oxide | AA |
| R402,
439,
473,
654,
658,
4424,
4438 | VRS - CY1JF182J | | 1.8k 0.063W 5% Metal
Oxide | AA | R421 | VRS - CY1JF680J | | 68 0.063W 5% Metal
Oxide | AA |
| R403,
426,
451,
464,
465,
472,
496,
655,
657,
1406,
1430,
1432,
1863,
2406,
2417,
2421,
4437,
4439 | VRS - CY1JF222J | | 2.2k 0.063W 5% Metal
Oxide | AA | R424,
471,
474,
1403,
2425 | VRS - CY1JF272J | | 2.7k 0.063W 5% Metal
Oxide | AA |
| R404,
405,
415,
418,
420,
425,
453,
475,
893,
4406 | VRS - CY1JF471J | | 470 0.063W 5% Metal
Oxide | AA | R427,
493,
612,
613,
621,
624,
632,
637,
638,
646,
647,
650,
662,
667,
840,
860,
861,
864,
873,
1407,
1408,
1422,
1869,
1888,
1890,
2420,
2432,
2433,
4414,
4420,
4442,
6405,
6406,
6407 | VRS - CY1JF103J | | 10k 0.063W 5% Metal
Oxide | AA |
| R406,
410,
413,
419,
1868,
4415,
4416 | VRS - CY1JF221J | | 220 0.063W 5% Metal
Oxide | AA | R428,
432,
433,
831,
2430,
6410 | VRS - CY1JF822J | | 8.2k 0.063W 5% Metal
Oxide | AA |
| R408,
409,
640 | VRS - CY1JF181J | | 180 0.063W 5% Metal
Oxide | AA | R429,
649,
1801,
4421,
4423 | VRS - CY1JF183J | | 18k 0.063W 5% Metal
Oxide | AA |
| R412,
1886 | VRS - CY1JF151J | | 150 0.063W 5% Metal
Oxide | AA | R430,
669,
1802,
1805,
1870,
6421,
6422 | VRS - CY1JF563J | | 56k 0.063W 5% Metal
Oxide | AA |
| R414,
642,
644,
651,
806,
809,
857,
890,
1427,
1804,
4422,
4458 | VRS - CY1JF333J | | 33k 0.063W 5% Metal
Oxide | AA | R434,
437,
607 | VRS - CA1JF103J | | 10k 0.063W 5% Metal
Oxide | AA |
| R416,
423,
868,
869,
1810, | VRS - CY1JF472J | | 4.7k 0.063W 5% Metal
Oxide | AA | R436,
463,
631, | VRS - CY1JF152J | | 1.5k 0.063W 5% Metal
Oxide | AA |

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|---|-----------------|---|-------------------------------|------|--|-----------------|---|-------------------------------|------|
| R653,
659,
2423,
2429 | VRS - CY1JF152J | | 1.5k 0.063W 5% Metal
Oxide | AA | R602 | VRS - CA1JF561J | | 560 0.063W 5% Metal
Oxide | |
| R443,
466,
818,
823,
872,
874 | VRS - CY1JF105J | | 1.0 0.063W 5% Metal
Oxide | AA | R603 | VRS - CA1JF224J | | 220k 0.063W 5% Metal
Oxide | |
| R445,
677,
847,
851,
891,
2405,
2410,
2414,
4455,
4456,
4473,
4478 | VRS - CY1JF000J | | 00 0.063W 5% Metal
Oxide | AA | R608,
609,
610,
611 | VRS - CY1JF474J | | 470k 0.063W 5% Metal
Oxide | AA |
| R448,
470 | VRS - CY1JF823J | | 82k 0.063W 5% Metal
Oxide | AA | R614 | VRS - CA1JF563J | | 56k 0.063W 5% Metal
Oxide | |
| R450,
6408 | VRS - CY1JF184J | | 180k 0.063W 5% Metal
Oxide | AA | R615 | VRS - CA1JF104J | | 100k 0.063W 5% Metal
Oxide | AA |
| R452,
836,
854,
1426 | VRS - CY1JF101J | | 100 0.063W 5% Metal
Oxide | AA | R616 | VRS - CA1JF273J | | 27k 0.063W 5% Metal
Oxide | |
| R455,
460,
499,
623,
663,
848,
862,
866,
1428,
4425,
4452,
4485 | VRS - CY1JF223J | | 22k 0.063W 5% Metal
Oxide | AA | R635,
660,
813,
867,
885,
1418,
2422 | VRS - CY1JF473J | | 47k 0.063W 5% Metal
Oxide | AA |
| R456,
1409,
4484 | VRS - CY1JF391J | | 390 0.063W 5% Metal
Oxide | AA | R636,
4462,
4479 | VRS - CY1JF153J | | 15k 0.063W 5% Metal
Oxide | AA |
| R458,
4413,
4481 | VRS - CY1JF681J | | 680 0.063W 5% Metal
Oxide | AA | R641,
880,
1401,
1410,
4465 | VRS - CY1JF821J | | 820 0.063W 5% Metal
Oxide | AA |
| R476 | VRS - CY1JF224J | | 220k 0.063W 5% Metal
Oxide | AA | R643,
665,
674,
832,
886,
889,
4443,
4470 | VRS - CY1JF562J | | 5.6k 0.063W 5% Metal
Oxide | AA |
| R478 | VRS - CY1JF274J | | 270k 0.063W 5% Metal
Oxide | AA | R645,
656,
668,
865,
870,
871,
2403 | VRS - CY1JF683J | | 68k 0.063W 5% Metal
Oxide | AA |
| R494,
670,
671,
2434,
2435 | VRS - CY1JF682J | | 6.8k 0.063W 5% Metal
Oxide | AA | R648,
661,
807,
810,
1808,
4450,
6409 | VRS - CY1JF154J | | 150k 0.063W 5% Metal
Oxide | AA |
| R497,
630,
897,
1429,
4409,
4482 | VRS - CY1JF331J | | 330 0.063W 5% Metal
Oxide | AA | R652,
875,
876,
1419,
2401,
4440 | VRS - CY1JF104J | | 100k 0.063W 5% Metal
Oxide | AA |
| R498,
622,
883,
4457 | VRS - CY1JF273J | | 27k 0.063W 5% Metal
Oxide | AA | R664 | VRS - CA1JF333J | | 33k 0.063W 5% Metal
Oxide | |
| | | | | | R672,
1423 | VRS - CA1JF682J | | 6.8k 0.063W 5% Metal
Oxide | AA |
| | | | | | R675,
676 | VRS - CY1JF394J | | 390k 0.063W 5% Metal
Oxide | AA |
| | | | | | R800,
801,
803,
812,
814, | VRS - CY1JF393J | | 39k 0.063W 5% Metal
Oxide | AA |

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|---|-----------------|---|-------------------------------|------|---|-----------------|---|-------------------------------|------|
| R830,
833,
884,
1800,
2436 | VRS - CY1JF393J | | 39k 0.063W 5% Metal
Oxide | AA | R1421 | VRS - CY1JF330J | | 33 0.063W 5% Metal
Oxide | AA |
| R802,
808,
811,
828,
1803 | VRS - CY1JF303J | | 30k 0.063W 5% Metal
Oxide | AA | R1425 | VRS - CY1JF750J | | 75 0.063W 5% Metal
Oxide | AA |
| R804 | VRS - CY1JF163F | | 16k 0.063W 1% Metal
Oxide | AA | R1883 | VRS - TV1JD563J | | 56k 0.063W 5% Metal
Oxide | AA |
| R805 | VRS - CY1JF153F | | 15k 0.063W 1% Metal
Oxide | AA | R2402,
2413,
4418,
4461,
4463,
4487,
4491 | VRS - CY1JF332J | | 3.3k 0.063W 5% Metal
Oxide | AA |
| R820 | VRS - CY1JF272F | | 2.7k 0.063W 1% Metal
Oxide | AA | R2418 | VRS - CY1JF121J | | 120 0.063W 5% Metal
Oxide | AA |
| R821 | VRS - CY1JF334J | | 330k 0.063W 5% Metal
Oxide | AA | R2419 | VRS - CY1JF913F | | 91k 0.063W 1% Metal
Oxide | AA |
| R822 | VRS - CY1JF684J | | 680k 0.063W 5% Metal
Oxide | AA | R2427,
4480 | VRS - CY1JF122J | | 1.2k 0.063W 5% Metal
Oxide | AA |
| R824,
4407,
4483 | VRS - CY1JF271J | | 270 0.063W 5% Metal
Oxide | AA | R4404 | VRS - CY1JF820J | | 82 0.063W 5% Metal
Oxide | AA |
| R835 | VRS - CY1JF363J | | 36k 0.063W 5% Metal
Oxide | AA | R4426 | VRS - CY1JF681F | | 680 0.063W 1% Metal
Oxide | AA |
| R837 | VRS - CA1JF101J | | 100 0.063W 5% Metal
Oxide | AA | R4427 | VRS - CY1JF472F | | 4.7k 0.063W 1% Metal
Oxide | AA |
| R839,
841,
842,
843,
844,
892,
898,
1885,
2407,
2411,
2415,
2471 | VRS - CY1JF561J | | 560 0.063W 5% Metal
Oxide | AA | R4428,
4460 | VRS - CY1JF332F | | 3.3k 0.063W 1% Metal
Oxide | AA |
| R845 | VRS - CA1JF393J | | 39k 0.063W 5% Metal
Oxide | AA | R4430 | VRS - CY1JF391F | | 390 0.063W 1% Metal
Oxide | AA |
| R850 | VRS - CY1JF106J | | 10 0.063W 5% Metal
Oxide | AA | R4431,
4433 | VRS - CA1JF473J | | 47k 0.063W 5% Metal
Oxide | AA |
| R853,
4435 | VRS - CY1JF471F | | 470 0.063W 1% Metal
Oxide | AA | R4451 | VRS - CA1JF102J | | 1.0k 0.063W 5% Metal
Oxide | AA |
| R858 | VRS - CA1JF823J | | 82k 0.063W 5% Metal
Oxide | AA | R4466 | VRS - CA1JF223J | | 22k 0.063W 5% Metal
Oxide | AA |
| R863,
4486,
6415 | VRS - CY1JF392J | | 3.9k 0.063W 5% Metal
Oxide | AA | R4468 | VRS - CY1JF122F | | 1.2k 0.063W 1% Metal
Oxide | AA |
| R877 | VRS - CY1JF223F | | 22k 0.063W 1% Metal
Oxide | AA | R4469 | VRS - CY1JF183F | | 18k 0.063W 1% Metal
Oxide | AA |
| R878 | VRS - CY1JF123F | | 12k 0.063W 1% Metal
Oxide | AA | R4489 | VRS - CY1JF225J | | 2.2 0.063W 5% Metal
Oxide | AA |
| R879 | VRS - CY1JF333F | | 33k 0.063W 1% Metal
Oxide | AA | R6401,
6402,
6404 | VRS - TV1JD330J | | 33 0.063W 5% Metal
Oxide | AA |
| R881 | VRS - CA1JF564J | | 560k 0.063W 5% Metal
Oxide | AA | R6403,
6404 | VRS - CY1JF123J | | 12k 0.063W 5% Metal
Oxide | AA |
| R887,
888 | VRS - CY1JF100J | | 10 0.063W 5% Metal
Oxide | AA | R6414 | VRS - CA1JF683J | | 68k 0.063W 5% Metal
Oxide | AA |
| R899 | VRS - CY1JF470J | | 47 0.063W 5% Metal
Oxide | AA | R6419 | VRS - CY1JF433J | | 43k 0.063W 5% Metal
Oxide | AA |
| R1411,
1412,
1413,
1416,
1420 | VRS - CY1JF390J | | 39 0.063W 5% Metal
Oxide | AA | R6420 | VRS - CY1JF243J | | 24k 0.063W 5% Metal
Oxide | AA |
| MISCELLANEOUS PARTS | | | | | | | | | |
| | | | | | FB1401 | RBLN-0035TAZZ | | Balun | |
| | | | | | P44 | QPLGN0363TAZZ | | Plug | AC |
| | | | | | P45 | QPLGN0263TAZZ | | Plug | AB |
| | | | | | RMC570 | RRMCU0007TAZZ | | Remote Receiver | |
| | | | | | SC41 | QSOCN0067FJZZ | | Socket | AF |
| | | | | | SC46 | QSOCN1848TAZZ | | Socket | AE |
| | | | | | SC47 | QSOCN0647TAZZ | | Socket | AE |
| | | | | | S5703,
5704,
5705 | QSW-K0088GEZZ | | Switch | AD |
| | | | | | S5706, | QSW-K0087GEZZ | | Switch | AC |

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|--|---|---|---|--|----------|----------|---|-------------|------|
| S5707,
5708,
5710,
5711,
5712,
5713 | QSW-K0087GEZZ | | Switch | AC | | | | | |
| OTHERS PARTS | | | | | | | | | |
| | SPAKC6329TAZZ
SPAKC6363TAZZ

SPAKC6364TAZZ

SPAKC6365TAZZ
SPAKP6049TAZZ
SSAKA0002CEZZ
TCADN0069TAZZ
TCADN0070TAZZ
TINSL0031TAZZ

TINSE0150TAZZ

TINSE0151TAZZ

TINSE0152TAZZ

RRMCG0020TASA

RRMCG0023TASA
QCNW-1140TA00
QCNW-1169TAZZ
VSP0028P-31WN
PNNOK0003TAZZ
RMICC0055TASA | | Packing Case (VL-H400S)
Packing Case (VL-H400H)

Packing Case (VL-H400X)

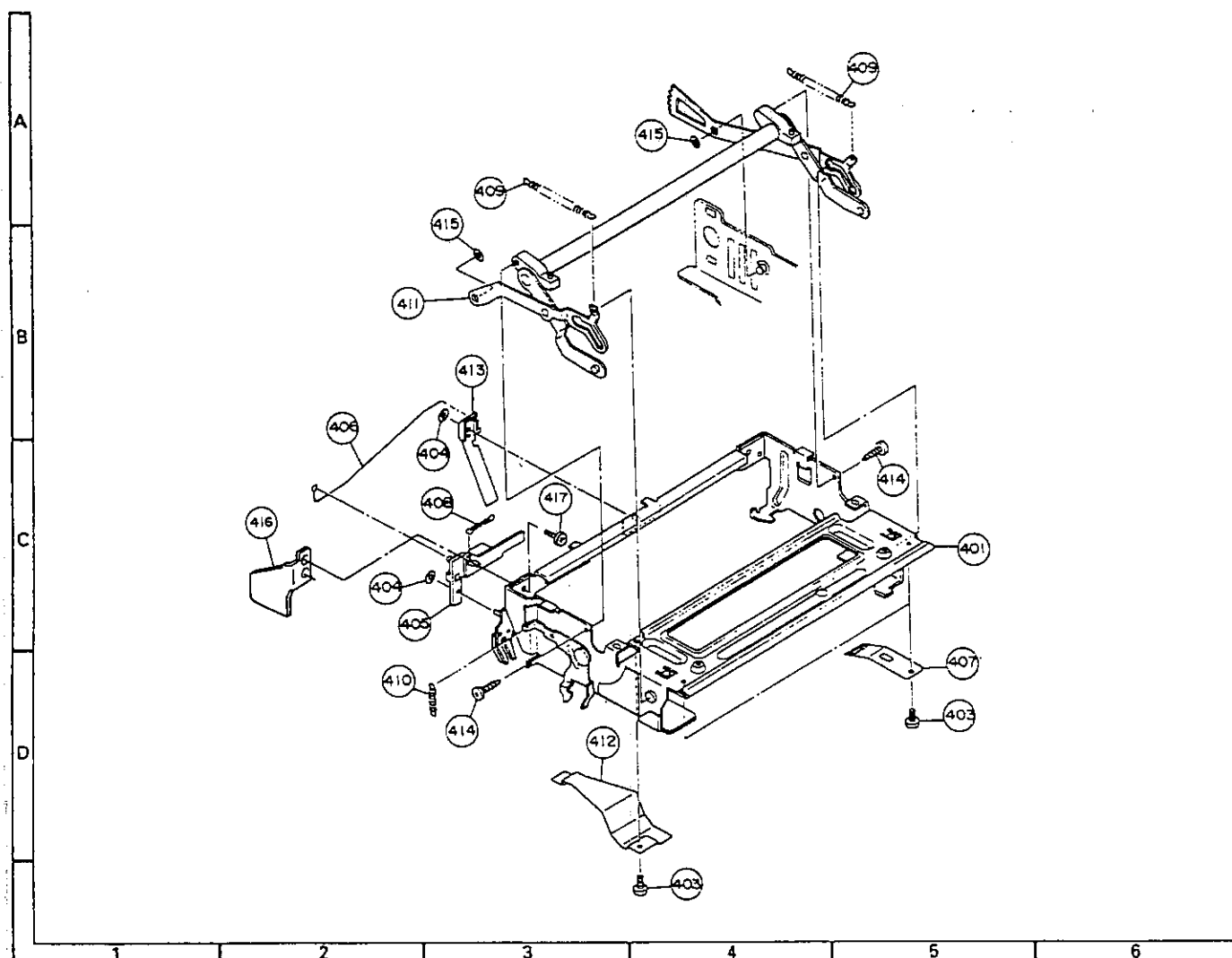
Packing Case (VL-H9E)
Wrapping Paper
Polyethylene Bag
Card (VL-H400S/H)
Card (VL-H400X)
Instruction Book (VL-H400S)
Instruction Book (VL-H400H)
Instruction Book (VL-H400X)
Instruction Book (VL-H9E)
Infrared R/C (VL-H400S/H/X)
Infrared R/C (VL-H9E)
DC Cable
AV Cable
Speaker
Cleaning Cloth
Microphone | AC
AA

 | | | | | |

CASSETTE COMPARTMENT ASS'Y PARTS LIST

★ MARK: SPARE PARTS DELIVERY SECTION

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|----------|---------------|---|----------------------------|------|----------|---------------|---|--------------------------|------|
| | CHLDX3067GE01 | | Cassette Compartment Ass'y | | 408 | MSPRT0354GEFJ | | Tape Protector Spring | AA |
| 401 | LHLDX3067GEZZ | | Cassette Housing Ass'y | | 409 | MSPRT0355GEFJ | | Up Spring | AA |
| 403 | LX-HZ3069GEFN | | Screw, M1.4 x 1.6Ni | | 410 | MSPRT0357GEFJ | | Lock Spring | AA |
| 404 | LX-WZ1063GE00 | | Cut Washer, 1.2-4-0.5 | AA | 411 | NSFTD0028GEZZ | | Main Shaft Ass'y | AN |
| 405 | MARMP0051GEZZ | | Protector Arm | AA | 412 | PGIDH0040GEFW | | Cassette Cover Guide | AB |
| 406 | MLNKM0013GEFJ | | Protector Rod | AA | 413 | PSHEP0005GEZZ | | Tape Protector Ass'y | AD |
| 407 | MSPRP0147GEFJ | | Depressing Spring | AC | 414 | LX-HZ3065GEFF | | B Tight, M1.7 x 5 | AA |
| | | | | | 415 | LX-WZ1056GE00 | | Cut Washer, 1.6-4.0-0.25 | AA |

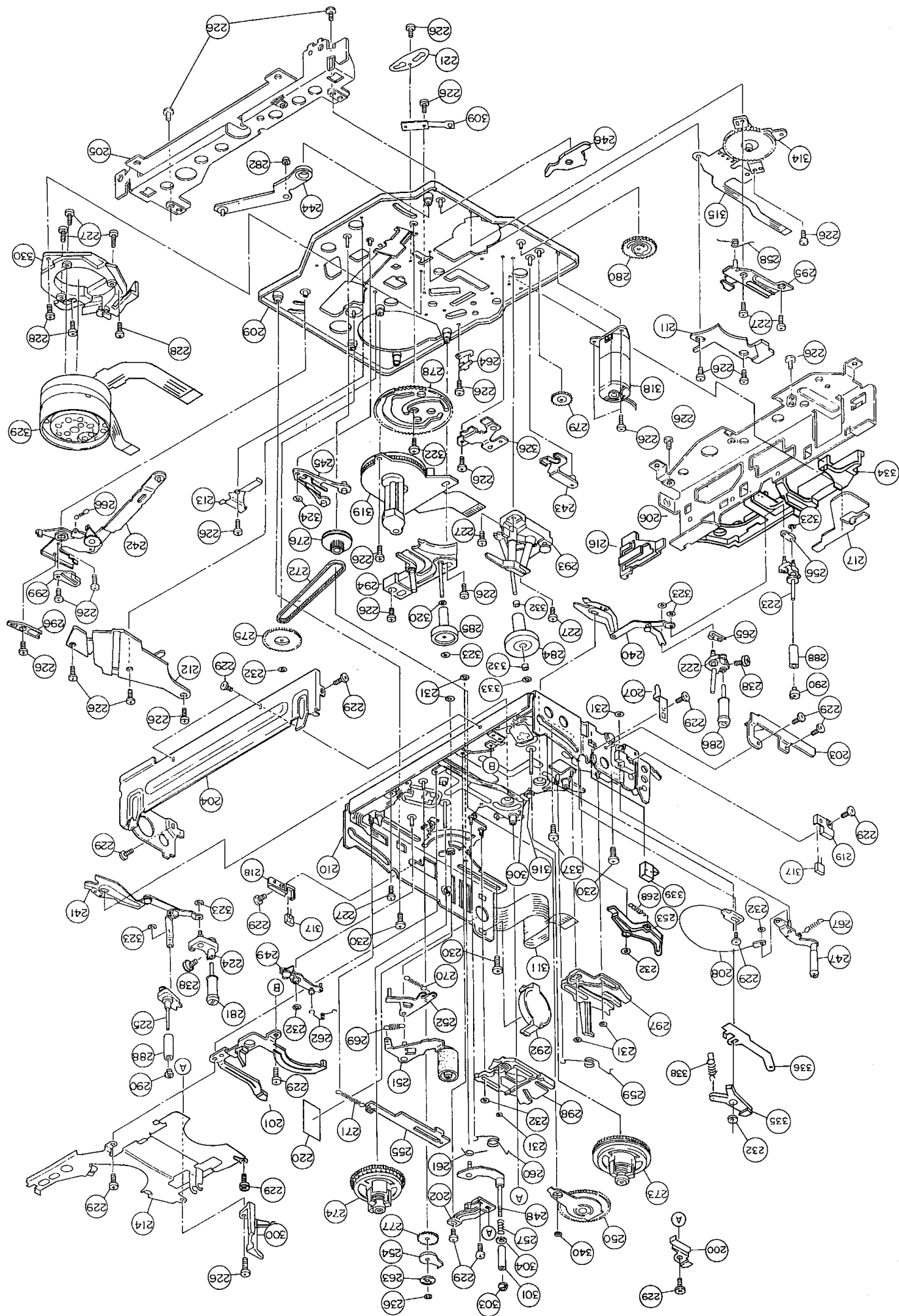


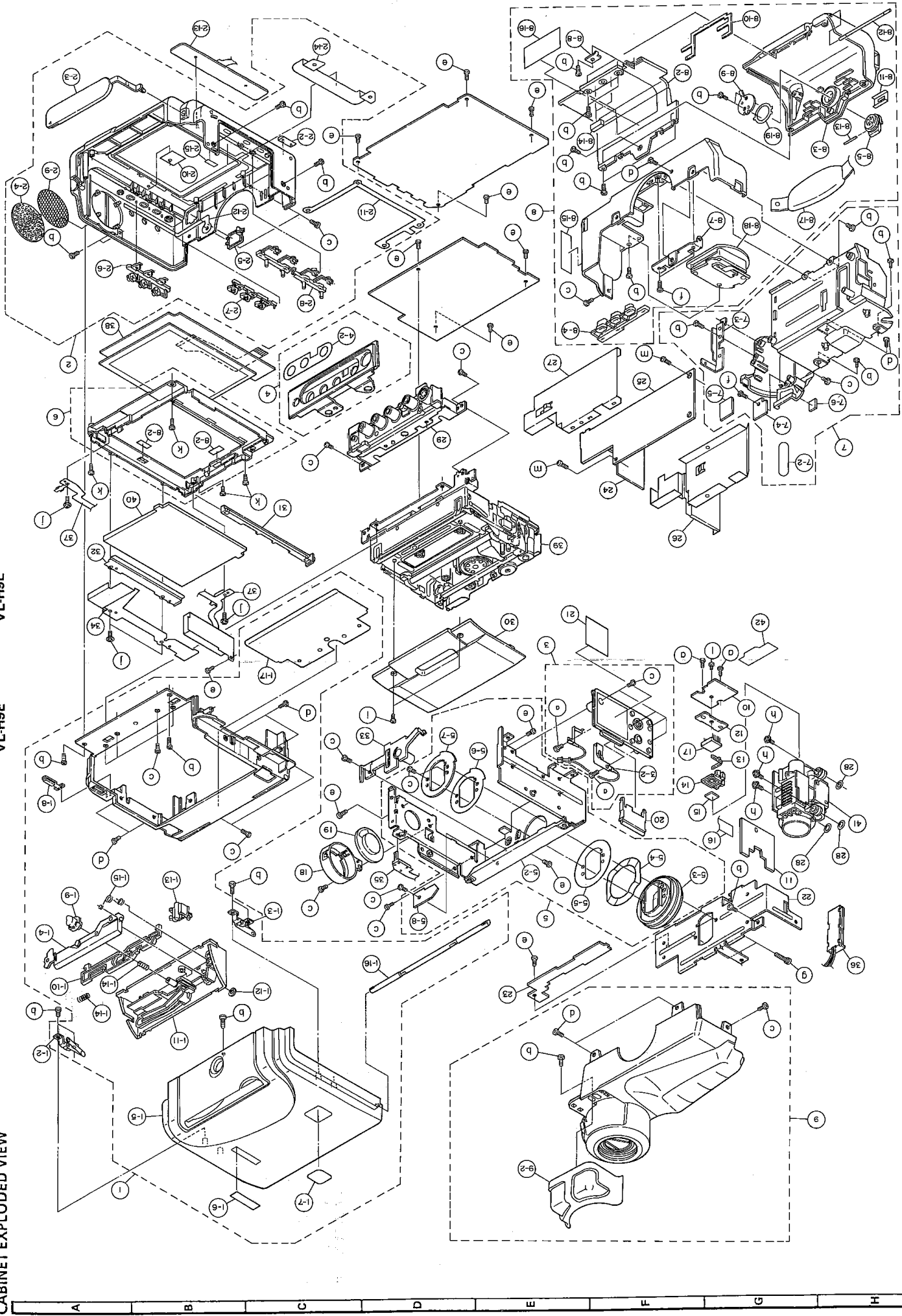
MECHANISM CHASSIS PARTS LIST

★ MARK: SPARE PARTS DELIVERY SECTION

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|----------|---------------|---|--------------------------------|------|----------|---------------|---|----------------------------------|------|
| 200 | LANGA0065GEFW | | Reel Stoper | | 251 | MLEVF0376GEZZ | | Pinch Roller Lever Ass'y | AQ |
| 201 | LANGF9525GEZZ | | Reel Lock Release Angle Ass'y | AE | 252 | MLEVF0377GEZZ | | Pinch Double Acting Lever Ass'y | AD |
| 202 | LANGG9086GEFW | | Slide Adjusting Angle | AC | 253 | MLEVP0226GEZZ | | Main Brake | AB |
| 203 | LANGG9087GEFW | | SL Guide Angle | AC | 254 | MLEVP0222GEZZ | | Lock Brake Lever | AA |
| 204 | LANGG9088GEFT | | Down Guide | AG | 255 | MSLiF0065GEFW | | Tu Holding Guide Operating Plate | AB |
| 205 | LANGJ0026GEFW | | HL Mechanism Frame F | AF | 256 | MSLiF0066GEZZ | | PBS2 Slider | AA |
| 206 | LANGJ0027GEFW | | HL Mechanism Frame R | AF | 257 | MSPRC0181GEFJ | | Tu Guide Adjusting Spring | AA |
| 207 | LANGQ9050GEFW | | Down SW Retaining Angle | AA | 258 | MSPRD0134GEFJ | | Eject Lever Spring | AA |
| 208 | LBNDK3019GEZZ | | Tension Wire Ass'y | AF | 259 | MSPRD0135GEFJ | | Slide Rail L Spring | AB |
| 209 | LCHSM0126GEZZ | | Main Chassis Ass'y | AV | 260 | MSPRD0136GEFJ | | Slide Rail R Spring | AA |
| 210 | CCHSS0033GE00 | | Slide Chassis Ass'y | BF | 261 | MSPRD0137GEFJ | | Tu Guide Arm Spring | AA |
| 211 | LDAiS1001GEZZ | | S Loading Arm Support | AB | 262 | MSPRD0138GEFJ | | Tu Ratchet Spring | AA |
| 212 | LDAiS1002GEZZ | | T Loading Arm Support | AB | 263 | MSPRP0144GEFJ | | Lock Brake Spring | AA |
| 213 | LDAiS3001GEFW | | SL Chassis Drive Lever Support | AB | 264 | MSPRP0145GEFJ | | PBT1 Holding Spring | AB |
| 214 | LHLDP3001GEFW | | LED Holding Angle | AE | 265 | MSPRP0146GEFJ | | PBS1 Slider | AA |
| 216 | LHLDW1128GEZZ | | Relay FPC Retainer | AB | 266 | MSPRT0348GEFJ | | EOT Release Lever Spring | AA |
| 217 | LHLDW1129GEZZ | | FPC Holder | AB | 267 | MSPRT0349GEFJ | | T Arm Spring | AA |
| 218 | LHLDZ1811GEZZ | | Start Sensor Holder | AC | 268 | MSPRT0362GEFJ | | Main Brake Spring | AA |
| 219 | LHLDZ1812GEZZ | | End Sensor Holder | AC | 269 | MSPRT0351GEFJ | | Pinch Pressure Spring | AA |
| 220 | LHLDZ1846GENZ | | FPC Cover | AB | 270 | MSPRT0352GEFJ | | Pinch Release Spring | AB |
| 221 | LHLDZ3043GEFW | | Pressure Lever Holder | AB | 271 | MSPRT0353GEFJ | | Tu Guide Operating Lever Spring | AB |
| 222 | LPOLM0041GEZZ | | Pole Base S1 Ass'y | AM | 272 | NBLTT0006GEZZ | | Timing Belt | AE |
| 223 | LPOLM0042GEZZ | | Pole Base S2 Ass'y | AL | 273 | NDAiV1057GEZZ | | S Reel Disk Ass'y | AN |
| 224 | LPOLM0043GEZZ | | Pole Base T1 Ass'y | AL | 274 | NDAiV1058GEZZ | | Tu Reel Disk Ass'y | AM |
| 225 | LPOLM0044GEZZ | | Pole Base T2 Ass'y | AM | 275 | NGERH1188GEZZ | | Relay Gear Ass'y | AD |
| 226 | LX-BZ3128GEFF | | Screw, M1.4×L2, D2.5 | AA | 276 | NGERH1189GEZZ | | Drive Gear Ass'y | AD |
| 227 | LX-BZ3129GEFF | | Screw, M1.4×L3, D2.5 | AA | 277 | NGERH1190GEZZ | | Lock Brake Gear | AB |
| 228 | LX-BZ3130GEFF | | Screw, M1.4×L4, D2.5 | AA | 278 | NGERH3037GEZZ | | Main Cam | AC |
| 229 | LX-BZ3131GEFN | | Screw, M1.4×L1.6, D3.0 | AA | 279 | NGERH3038GEZZ | | Loading Gear Ass'y | AF |
| 230 | LX-BZ3132GEFF | | Screw, M1.4×L1.5, D3.5 | AA | 280 | NGERH3040GEZZ | | T Cam | AD |
| 231 | LX-WZ1052GE00 | | Cut Washer, φ0.7-φ1.8-t0.2 | AA | 281 | NROLM0024GEZZ | | Guide Roller T1 Ass'y | AQ |
| 232 | LX-WZ1053GE00 | | Cut Washer, φ0.7-φ2.5-t0.2 | AA | 282 | NROLM0025GEZZ | | Cam Roller | AD |
| 236 | LX-WZ1066GE00 | | Cut Washer, φ0.7-φ2.2-t0.13 | AA | 284 | NROLM0030GEZZ | | Si Roller -H Ass'y | AW |
| 238 | LX-XZ3034GEZZ | | Worm Screw, M1.2×1.5 | AB | 285 | NROLP0100GEZZ | | TS Roller Ass'y | AC |
| 240 | MARMM0096GEZZ | | S Loading Arm Ass'y | AK | 286 | NROLP0097GEZZ | | Guide Roller S1 -H Ass'y | AH |
| 241 | MARMM0100GEZZ | | T Loading Arm Ass'y | AK | 288 | NROLP0092GEZZ | | Guide Roller T2 | AF |
| 242 | MLEVF0363GEZZ | | Pinch Drive Lever Ass'y | AN | 290 | PCAPS1020GEZZ | | GRT2 Cap | AB |
| 243 | MLEVF0364GEZZ | | T Arm Operating Lever Ass'y | AE | 292 | PDMP-0007GEZZ | | Damper | AH |
| 244 | MLEVF0365GEZZ | | SL Chassis Drive Lever Ass'y | AF | 293 | PGiDM0111GEZZ | | S Stopper -H Ass'y | AW |
| 245 | MLEVF0366GEZZ | | Loading Pressure Lever Ass'y | AF | 294 | PGiDM0099GEZZ | | Tu Stopper Ass'y | AQ |
| 246 | MLEVF0367GEZZ | | Eject Lever Ass'y | AD | 295 | PGiDM0114GEZZ | | T Arm Rail L | AB |
| 247 | MLEVF0368GEZZ | | Tension Arm Ass'y | AN | 296 | PGiDM0102GEZZ | | P Guide Rail | AB |
| 248 | MLEVF0369GEZZ | | Tu Guide Arm Ass'y | AG | 297 | PGiDM0103GEZZ | | Slide Rail L | AC |
| 249 | MLEVF0370GEZZ | | Tu Ratchet Ass'y | AH | 298 | PGiDM0104GEZZ | | Slide Rail R | AC |
| 250 | MLEVF0375GEZZ | | Swing Arm Ass'y | AH | 299 | PGiDM0106GEZZ | | EOT Operating Lever Guide | AB |
| | | | | | 300 | PGiDM0107GEZZ | | PB Protector | AB |
| | | | | | 301 | PGiDP0026GEFW | | Tu Guide | AD |

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|----------|---------------|---|-------------------------------|------|----------|---------------|---|-----------------------------------|------|
| 303 | PGIDS0039GEFW | | Tu Guide Upper Flange | AD | 326 | LHLDZ3042GEFW | | T Cam Holder | AB |
| 304 | PGIDS0040GEFW | | Tu Guide Lower Flange | AA | 329 | DDRMW0030GE05 | | Drum Ass'y | CC |
| 306 | PSPAZ0316GEZZ | | LED Spacer | AB | 330 | PGIDC0047GEZZ | | Drum Base Ass'y | AR |
| 309 | QBRSK0027GEZZ | | Earth Brush Ass'y | AC | 332 | PSPAX0012GEZZ | | Si Roller Spacer | AA |
| 311 | QPWBH4016GEZZ | | Relay FPC-L | AH | 333 | LX-WZ1060GE00 | | Cut Washer,
φ1.2-φ2.5-t0.25 | AA |
| 314 | QSW-R0031GEZZ | | Mode SW | AL | 334 | PGIDM0113GEZZ | | Tape Guide | AD |
| 315 | RDTCH0031GEZZ | | DEW Sensor Ass'y | AN | 335 | MLEVP0225GEZZ | | L Brake | AA |
| 316 | RH-PX0064TAZZ | | Cassette LED | AD | 336 | MLEVF0381GEFW | | L Brake Operating Lever | AB |
| 317 | RH-PX0065TAZZ | | S/E Sensor | AC | 337 | LX-BZ3138GEFF | | Special Screw,
M1.4×L1.5, D3.5 | AB |
| 318 | RMOTM1059GEZZ | | Loading Motor Ass'y | AW | 338 | MSPRT0361GEFJ | | L Brake Spring | AA |
| 319 | RMOTN2046GEZZ | | Capstan Motor | BB | 339 | QSW-M0033GEZZ | | Cassette Control
Down SW | AC |
| 320 | XWHJZ12-02025 | | Washer, φ1.2-φ2.5-t0.25 | AA | 340 | LX-WZ1071GE00 | | Cut Washer,
φ0.7-φ1.8-t0.1 | AA |
| 322 | LX-BZ3136GEFD | | Screw, 2 Kinds, M1.4-L2.5 | AA | | | | | |
| 323 | LX-WZ1064GE00 | | Cut Washer,
φ0.8-φ2.5-t0.2 | AA | | | | | |
| 324 | LX-WZ1029GE00 | | Cut Washer,
φ1.2-φ3-t0.25 | AA | | | | | |





CABINET PARTS LIST

★ MARK: SPARE PARTS DELIVERY SECTION

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|----------|----------------|---|-----------------------------------|------|----------|----------------|---|-----------------------------------|------|
| 1 | CCABA6104TA01 | | Cabinet V Ass'y
(VL-H400S/H/X) | BD | 5-6 | PSPA Z0065TAZZ | | Rotation Section Sheet B | AD |
| 1 | CCABA6104TA03 | | Cabinet V Ass'y (VL-H9E) | | 5-7 | LANGH0050TAFW | | Positioning Plate | AC |
| 1-2 | CANGK0297TA01 | | Positioning Stay Ass'y
(Upper) | AK | 5-8 | QSW-Z0052TAZZ | | Rotation Detection
Switch | AM |
| 1-3 | CANGK0297TA02 | | Positioning Stay Ass'y
(Lower) | AK | 6 | CHLDZ1187TA01 | | L Holder Ass'y | AK |
| 1-4 | CLEGM0019TA01 | | Stand Ass'y | AN | 6-2 | TLABZ0306TAZZ | | Shielding Label | AB |
| 1-5 | GFTAC1115TASA | | VCR Lid (VL-H400S/H/X) | AS | 7 | DCABC6029TA01 | | Camera Cabinet C Ass'y | AW |
| 1-5 | GFTAC1120TASA | | VCR Lid (VL-H9E) | | 7-2 | HBDGP0057TASA | | Camera Name Plate | |
| 1-6 | HBDGB0035TASA | | Badge "SHARP" | | 7-3 | LANGK0291TAFW | | Camera Fitting | AB |
| 1-7 | HBDGS0054TASA | | Badge LCD | AE | 7-5 | PMLT-0094TAZZ | | Camera Specer A | |
| 1-8 | JBTN-0215TASB | | EJECT Button | AE | 7-6 | PMLT-0095TAZZ | | Camera Specer B | |
| 1-9 | JBTN-0218TASA | | VCR Lid Open Button | AE | 8 | DCABE6029TA01 | | Camera Cabinet E Ass'y | BB |
| 1-10 | LHLDZ1220TAZZ | | VCR Lid Lock Holder | AC | 8-2 | GCOVA1303TASA | | Battery Rear Cover | AF |
| 1-11 | LHLDZ1221TAZZ | | Stand Holder | AF | 8-3 | GFTAB1035TASA | | Battery Cover | AN |
| 1-12 | LX-WZ1006GE00 | | Cut Washer | AA | 8-4 | JBTN-0222TASA | | Camera Operation
Button A | AE |
| 1-13 | MLEVP0010TAZZ | | VCR Lid Lock Lever | AC | 8-5 | JKNBP0093TASA | | Battery Cover Lock
Knob A | AE |
| 1-14 | MSPRC0059TAFJ | | VCR Lid Lock Spring | | 8-6 | JKNBP0094TASA | | Battery Cover Lock
Knob B | AE |
| 1-15 | MSPRD0022TAFJ | | Stand Support Spring | AB | 8-7 | LANGK0293TAFW | | Battery Hinge Fitting | AC |
| 1-16 | NSFTZ0019TAZZ | | Axle Damper | AK | 8-8 | LANGK0294TAFW | | Battery Shaft Fitting | AA |
| 1-17 | PCOVP9035TA00 | | Cassette Control Lid
Cover | AC | 8-9 | LANGK0295TAFW | | Battery Shaft Crossarm
Fitting | |
| 2 | CCABB6104TA01 | | Cabinet L Ass'y
(VL-H400S/H) | BA | 8-10 | LANGK0296TAFW | | Battery Lock Fitting | |
| 2 | CCABB6107TA01 | | Cabinet L Ass'y
(VL-H400X/H9E) | BA | 8-11 | NSPRP0112TAFW | | Battery Knob Spring | AA |
| 2-2 | GCOVA1302TASA | | Remote Control
Receptor Cover | AB | 8-12 | NSFTZ0020TAFW | | Battery Hinge Shaft | AC |
| 2-3 | GCOVA1304TASA | | AV Terminal Cap | | 8-13 | MSFTZ0021TAFW | | Battery Lock Shaft | AA |
| 2-4 | GCOVA1306TAKA | | Speaker Cover | AE | 8-14 | PSPA Z0077TAZZ | | Battery Crossarm Spacer | |
| 2-5 | GFTAS1002TASA | | BL Lid | AC | 8-15 | TLABH0168TAZZ | | Inversion caution Label | AA |
| 2-6 | JBTN-0219TASA | | Operation Button A | AC | 8-16 | TLABH0176TAZZ | | Battery Label | AB |
| 2-7 | JBTN-0220TASA | | Operation Button B | AE | 8-17 | UBNDT0069TASA | | Hand Strap | |
| 2-8 | JBTN-0221TASA | | Operation Button C | AE | 8-19 | MSPRP0113TAFW | | Battery Lock Spring | |
| 2-9 | PCOVP9038TAZZ | | Speaker Net | | 9 | CCABD6029TAK1 | | Camera Cabinet D Ass'y | BA |
| 2-10 | PZETV0283TAZZ | | Light Guide Plate
(Upper) | AB | 9-2 | RMICC0055TASA | | Microphone | BA |
| 2-11 | QEARP0141TAZZ | | LCD Earth Plate | AD | 10 | DUNTK2435QA00 | | CCD P.W.B | - |
| 2-12 | QEARP0156TAZZ | | Inverter Earth Plate | | 11 | DUNTK2438QA00 | | Lens P.W.B | - |
| 2-13 | QSW-Z0077TAZZ | | VCR Operation Switch | AR | 12 | LANGK0280TAFW | | CCD Retaining Sheet | AD |
| 2-14 | PZETV0290TAZZ | | Light Guide Plate | | 13 | LHLDZ1173TA00 | | CCD Positioning Holder | AB |
| 2-15 | PZETV0289TAZZ | | Light Guide Plate (Bottom) | | 14 | PCOVM8014TA00 | | CCD Dust Protection
Rubber | AC |
| 3 | CDAL-1041TAK1 | | Tripod Ass'y | AL | 15 | PFILW0058TAZZ | | Crystal | AW |
| 3-2 | QCNW-1187TAZZ | | Lithium Terminal Unit | AG | 16 | QCNW-1260TAZZ | | Lens~Camera P.W.B FPC | AF |
| 4 | CCASP0053TA01 | | AV Terminal Case Ass'y | AM | 17 | VHILZ236351-1 | | CCD Sensor | BR |
| 4-2 | HINDP0171TASA | | AV Terminal Nameplate | | 18 | LHLDZ1186TAZZ | | Speaker Holder | AC |
| 5 | CANGF0279TA01 | | MH Frame Ass'y | AY | 19 | VSP0028P-32WN | | Speaker | |
| 5-2 | LANGF0279TAFW | | MH Frame | AQ | 20 | LHLDB1015TASA | | Lithium Lid | AC |
| 5-3 | GDAI-3046TAFW | | Rotation Section Spacer | AN | 21 | TLABM1484TAZZ | | Model Label (VL-H400S) | AB |
| 5-4 | MSPRP0100TAFW | | Rotation Section plate
Spring | AC | 21 | TLABM1489TAZZ | | Model Label (VL-H400H) | |
| 5-5 | PSPA Z0064TAZZ | | Rotation Section Sheet A | AC | 21 | TLABM1490TAZZ | | Model Label (VL-H400X) | AB |
| | | | | | 21 | TLABM1491TAZZ | | Model Label (VL-H9E) | |
| | | | | | 22 | LANGF0288TAFW | | Rotating Frame | AG |
| | | | | | 23 | QSW-Z0079TAZZ | | Camera Switch Unit | AQ |

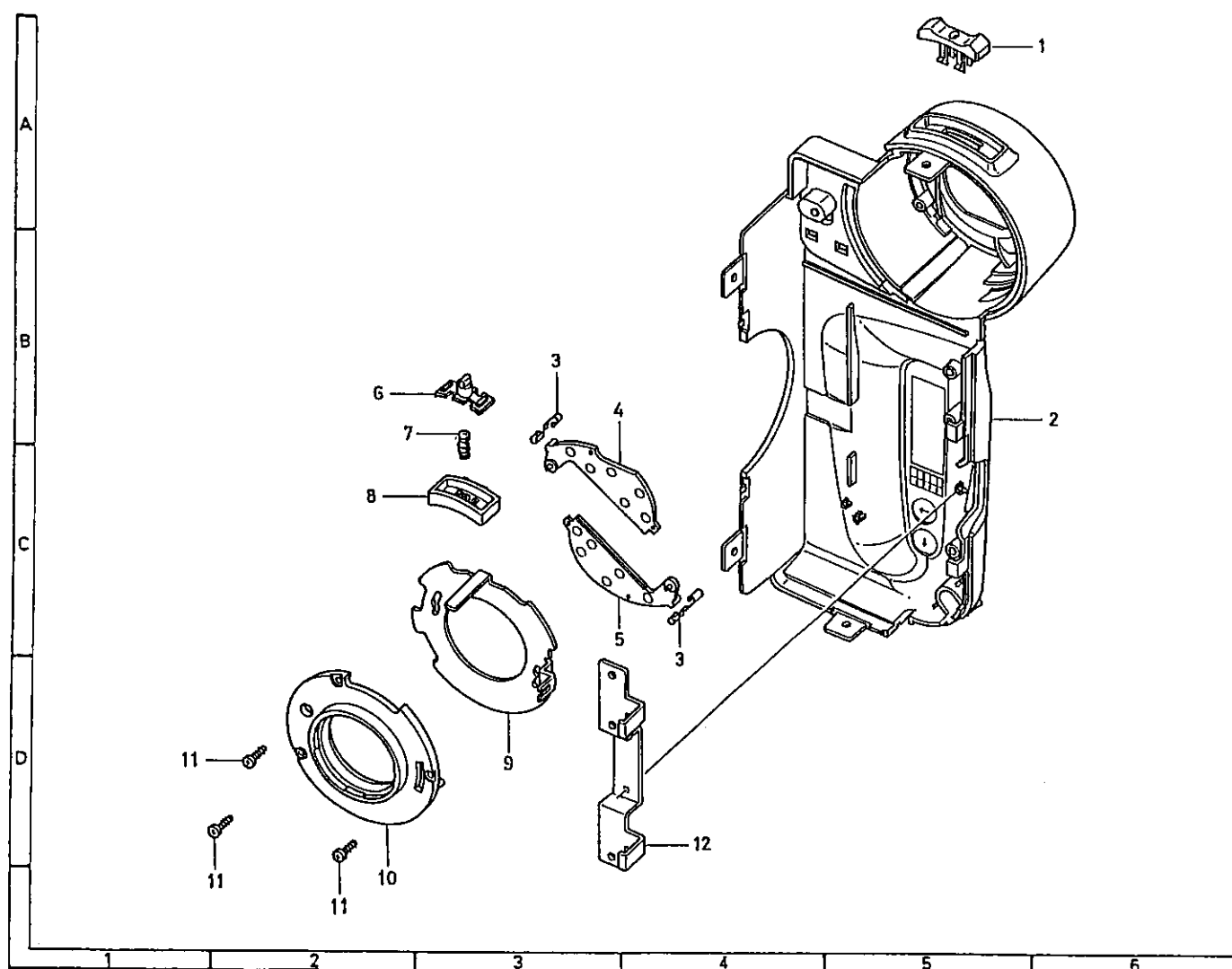
★ MARK: SPARE PARTS DELIVERY SECTION

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|----------|---------------|---|---------------------------|------|----------|---------------|---|-----------------------------|------|
| 24 | DUNTK2436QA00 | | Camera Sub P.W.B | - | 42 | QPWBH2440TAZZ | | CCD FPC | - |
| 25 | DUNTK2437QA00 | | Camera Main P.W.B | - | 44 | QSW-Z0080TAZZ | | Electric Source Switch Unit | AP |
| 26 | PSLDM3154TAFW | | Camera Shild Case A | AN | 45 | QSW-Z0081TAZZ | | Zoom SW Unit | AS |
| 27 | PSLDM3155TAFW | | Camera Shild Case B | AF | a | XEBSD20P06000 | | Screw (M2-6) | AA |
| 28 | PSPAZ0071TA00 | | Lens Spacer | AA | b | LX-HZ0018TAFF | | Screw (M2-6) | AA |
| 29 | QTANJ0034TAZZ | | AV Terminal | AV | c | XIPSF20P04000 | | Screw (M2-4) | AA |
| 30 | GFTAC1025GESB | | Cassete Compartment Cover | AF | d | XIPSF20P03000 | | Screw (M2-3) | AA |
| 31 | CLMPV0006TA01 | | Fluorescent Tube Unit | AZ | e | XIPSD20P03000 | | Screw (M2-3) | AA |
| 32 | LANGG0039TAFW | | LCD Holder Guide | AC | f | LX-HZ0030TAFF | | Screw (M2-4) | AA |
| 33 | LHLDW1027TAZZ | | FPC Holder | AC | g | XBPSD26P12J00 | | Screw (M2.6-12) | AA |
| 34 | PZETV0288TAZZ | | Insulator Sheet A | | h | LX-HZ3037GEFD | | Screw (M2-6) | AA |
| 35 | QSW-Z0051TAZZ | | EJECT Switch Unit | AL | i | LX-BZ0175TAFF | | Screw (M1.7-5) | AA |
| 36 | QTANZ0053TAZZ | | Battery Terminal | AK | j | LX-HZ3025CEFF | | Screw (M1.7-5) | AA |
| 37 | RUNTK0291TAZZ | | Inverter Unit | BC | k | XJPSD20P06000 | | Screw (M2-6) | AA |
| 38 | CPNLC0359RM01 | | LCD Panel Unit | CF | l | LX-BZ0176TAFF | | CCD Fixing Screw | AA |
| 39 | DSETU0288KE00 | | VCR P.W.B Unit | - | | XEBSD20P05000 | | Screw (M2-5) Tapping | AA |
| 40 | CGIDM0010TA01 | | Light Guide Plate Unit | AZ | | LX-WZ1006GE00 | | Cut Washer (Stand) | AA |
| 41 | CLNSA0119TA01 | | Lens Unit | BV | | | | | |

FRONT PANEL UNIT PARTS LIST

★ MARK: SPARE PARTS DELIVERY SECTION

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|----------|---------------|---|---------------------|------|----------|---------------|---|--------------------|------|
| | CCABD6029TAK1 | | Front cover ass'y | | 7 | 99JXSHC516338 | | Knobs spring | AB |
| | CCABD6029TAK1 | | Front panel ass'y | | 8 | 99JXSHC516337 | | Knob holder | AC |
| 1 | 99JXSHC516335 | | Knob | AC | 9 | 99JXSHC516333 | | Operation ring | AG |
| 2 | 99JXSHC516332 | | Front Panel | AW | 10 | 99JXSHC516334 | | Ring holder | AD |
| 3 | 99JXSH515848 | | Feather SP | AC | 11 | 99JBTP174025 | | Cross screw (Ni) | AA |
| 4 | 99JXSH515842 | | Shutter feather (1) | AE | 12 | 99JXSHC516330 | | Lock metal | AF |
| 5 | 99JXSH515843 | | Shutter feather (2) | AE | 13 | 99JXSHC516340 | | Aluminum sheet (1) | AD |
| 6 | 99JXSHC516336 | | Lock button | AC | 14 | 99JXSHC516341 | | Aluminum sheet (2) | AD |

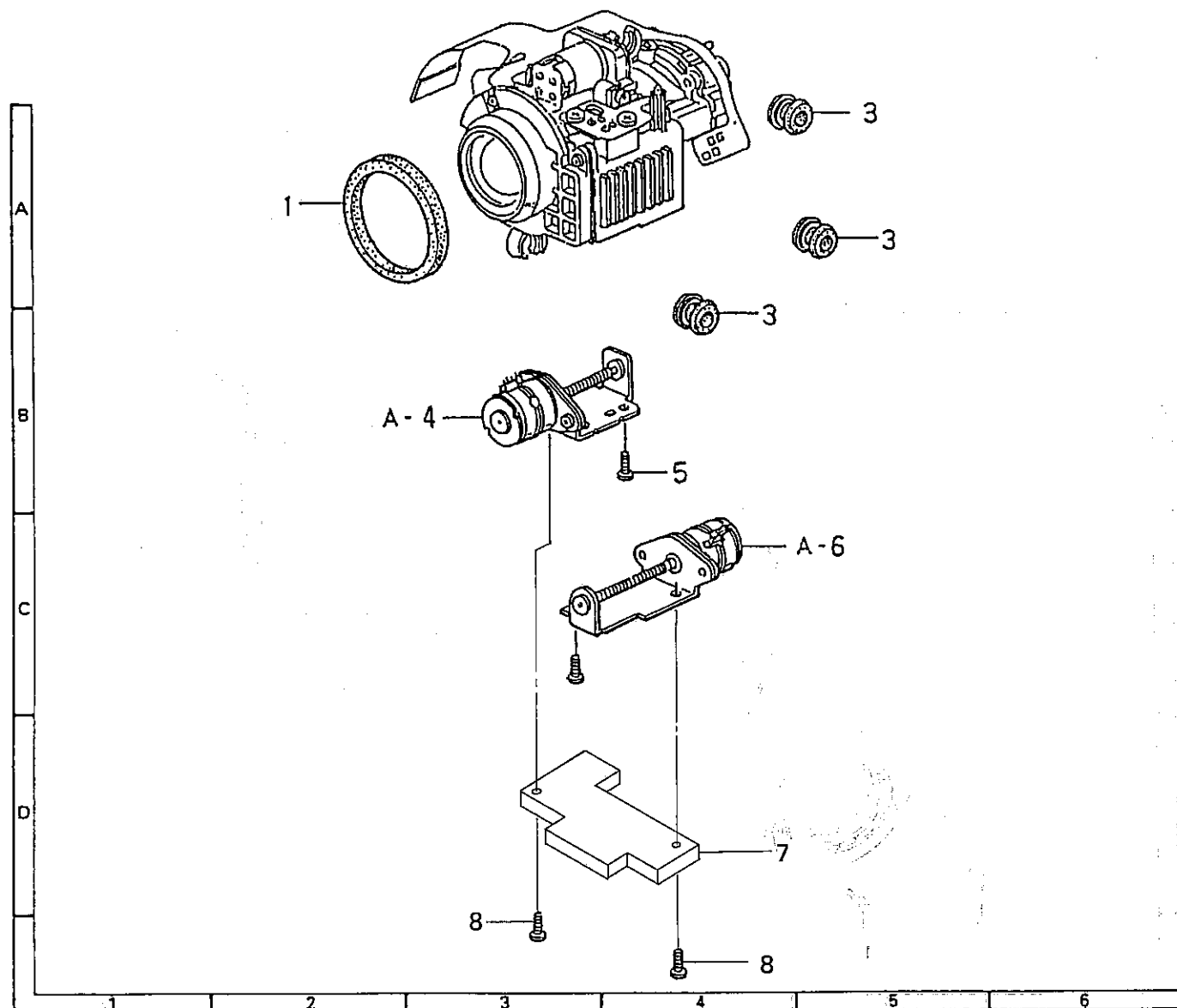


LENS UNIT PARTS LIST

NO. 003 YR0V1130271 4/01

★ MARK: SPARE PARTS DELIVERY SECTION

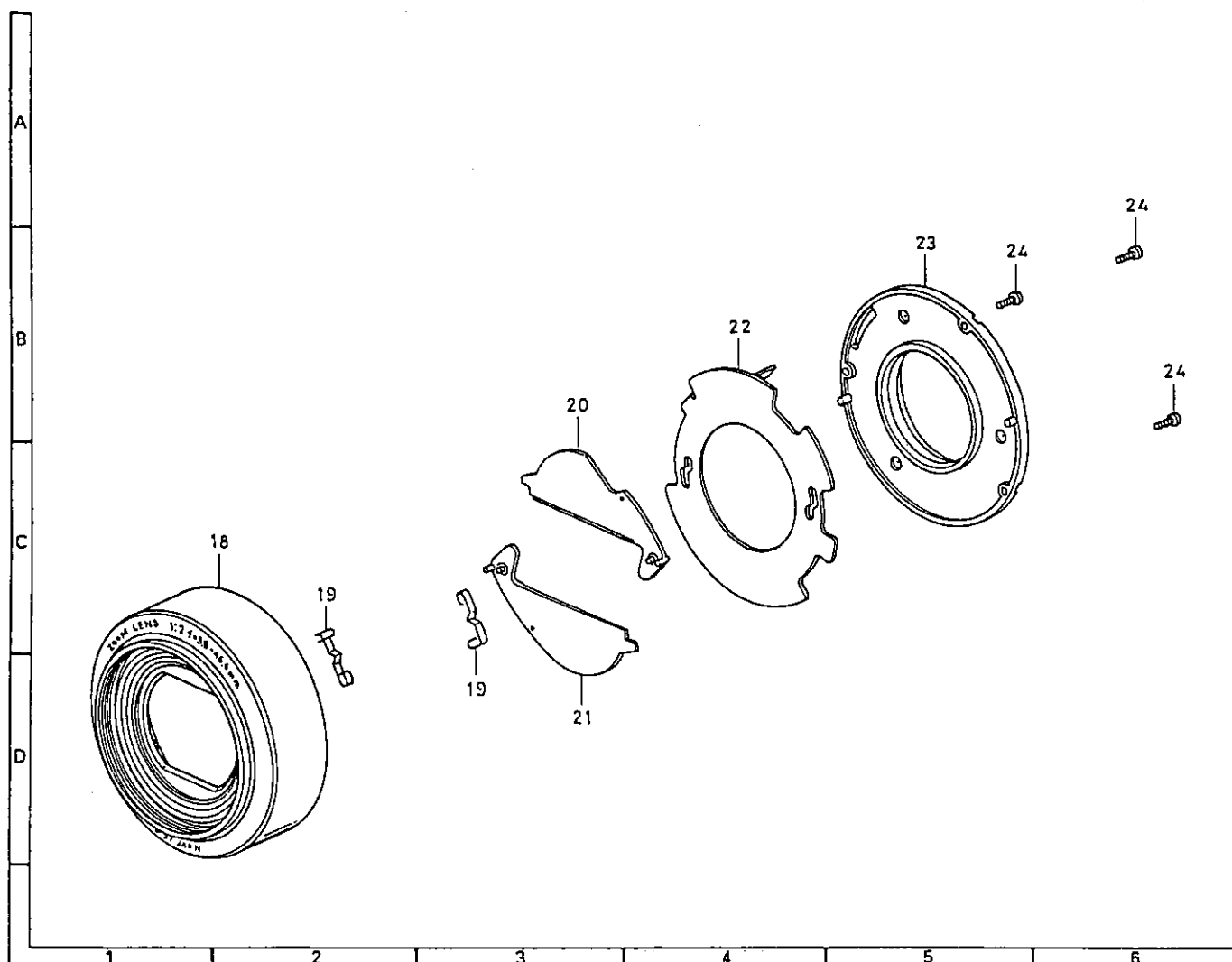
| Ref. No. | Part No. | Description | Code | Ref. No. | Part No. | Description | Code |
|----------|------------------|-----------------------|------|----------|---------------|----------------------|------|
| | 99JCLNSA0119TA01 | Lens Unit | BV | 5 | 99JBTP173525 | Screw(B) | AA |
| 1 | 99JXSH515825 | Front Group Rubber | AC | A-6 | 99JXSHC516306 | F Motor Ass'y | AY |
| 3 | 99JXSH515815 | Anti-Vibration Rubber | AC | 7 | 99JXSHC516313 | Anti-Vibration Sheet | AG |
| A-4 | 99JXSH515818 | F Motor Ass'y | AY | 8 | 99JBTP176530 | Screw(B) | AA |



SHUTTER UNIT PARTS LIST

★ MARK: SPARE PARTS DELIVERY SECTION

| Ref. No. | Part No. | ★ | Description | Code | Ref. No. | Part No. | ★ | Description | Code |
|----------|---------------|---|------------------|------|----------|--------------|---|------------------|------|
| | CCOVA1270TA01 | | Shutter Unit | AU | 21 | 99JXSH515843 | | Shutter Leaf (2) | AE |
| 18 | 99JXSH515841 | | Cover | AG | 22 | 99JXSH515844 | | Control Ring | AF |
| 19 | 99JXSH515846 | | Leaf Spring | AC | 23 | 99JXSH515845 | | Ring Retainer | AD |
| 20 | 99JXSH515842 | | Shutter Leaf (1) | AE | 24 | 99JBTP174025 | | Screw | AA |



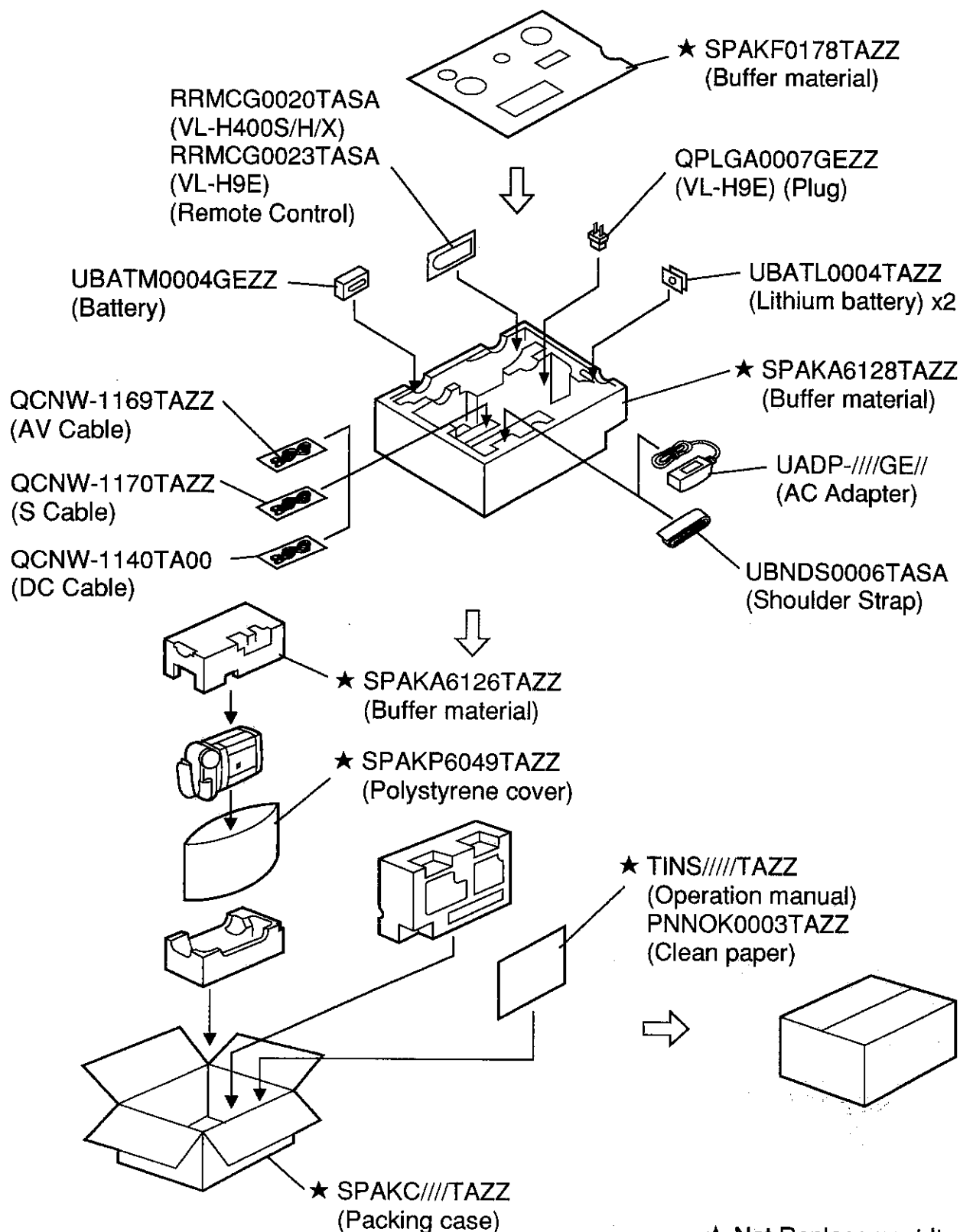
14. PACKING OF THE SET

● SETTING POSITIONS OF SWITCH

Power Switch at "OFF" Position

● ACCESSORY PART CORD LIST BY MODELS

| Model | AC Adapter | Operation Manual | Packing Case |
|----------|---------------|------------------|----------------|
| VL-H400U | UADP-0156GEZZ | TINSE0153TAZZ | SPACKC6358TAZZ |
| VL-H400U | UADP-0165GEZZ | TINSE0372TAZZ | SPACKC6668TAZZ |



15. AC ADAPTER

| | |
|-----------------|---------------------------------|
| | UADP-0158GEZZ (VL-H400S) |
| | UADP-0159GEZZ (VL-H400H) |
| | UADP-0157GEZZ (VL-H400X) |
| UNIT No. | UADP-0160GEZZ (VL-H9E) |

Features

- Compact and light-weight design for easier portability.
- Automatic voltage change AC 110V to AC 240V allows the adapter usage even in your trips abroad.
- Charging function with battery pack.
- Rapid charging function to enable the charging in a shorter period of time.

Specifications

| | |
|------------------------------|--|
| Power Requirement: | AC 110-240V, 50/60Hz |
| DC Output: | DC 6.0V |
| Power Consumption: | 23W |
| Dimensions (approx.): | 70 (W) × 44 (H) × 164 (D) mm |
| Weight (approx.): | 390g (VL-H400S/X/H9E)
460g (VL-H400H) |

* Specifications are subject to change without notice.

15-1. PROCEDURES ON SERVICING

● Disassembly

1. Remove the two screws ② from the bottom of the case ①.
2. Remove the top case ③.
3. Take out the shield plates ④ and ⑤.
4. Remove the three supporters ⑥ to take out the heat sinks ⑦ and ⑧.
5. Remove the three supporters ⑨ to take out the terminal box ⑩.

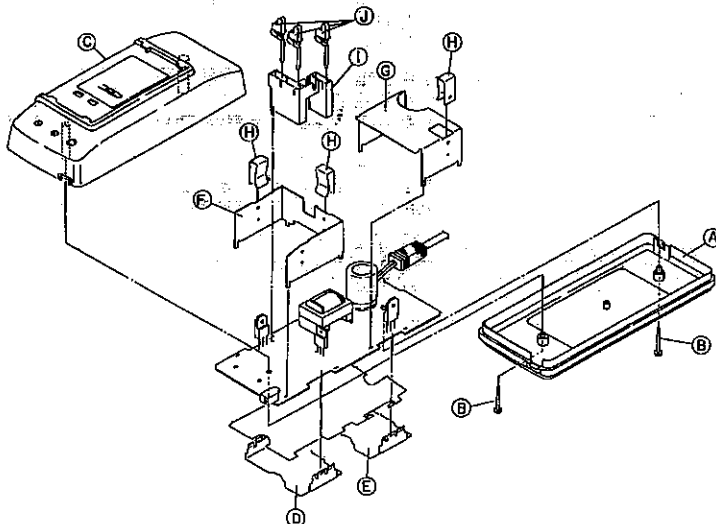


Figure 15-1.

15-2. OPERATION MANUAL

15-2-1. Outline

The AC adapter is designed to be used as the power supply for the camcorder as well as to rapidly re-charge its battery.

This unit consists of a separately excited switching regulator which employs control IC and a multi-functional circuit in the secondary side as shown by the block diagram in Fig. 15-2-1.

The primary control circuitry and the secondary multi-functional circuitry, composed mainly of surface mounted components, are housed in a small portable casing to cope with various user applications.

The multi-input type adapter accepts the input voltages of 110-240V at 50/60Hz. This handy unit can therefore be carried around and used all over the world.

The basic operation is controlled by two sections. In the power switching section, constant-voltage and constant-current controls are performed by comparing with the reference voltage at the secondary side. The battery charging section, on the other hand, is provided with timers, various detection circuits and sequence controller. As an AC adapter, the unit feeds the EIAJ-rated constant-voltage DC power through its DC jack, and as a battery charger, the unit starts the rapid charging operation when the dedicated Ni-Cd battery is placed in position with the DC plug unconnected.

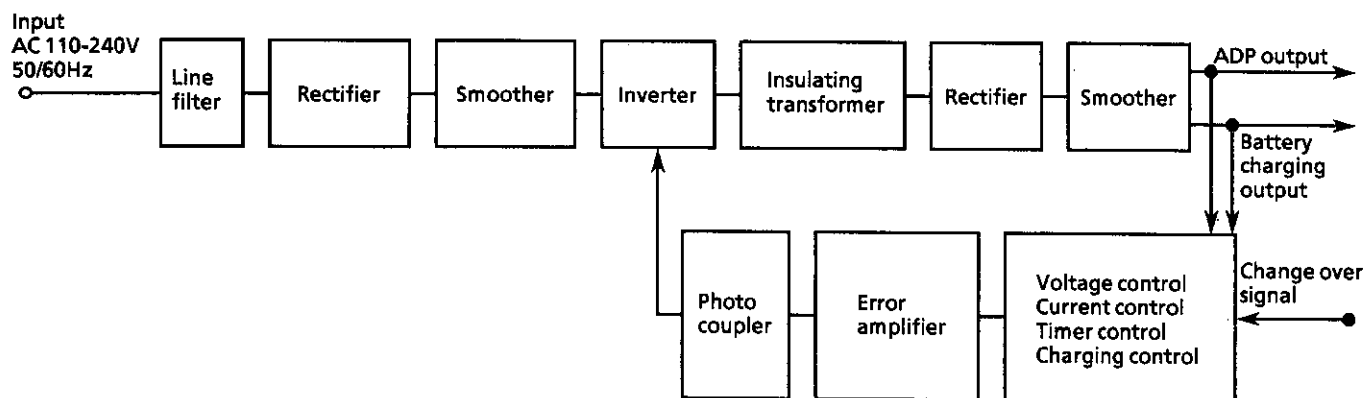


Figure 15-2-1. Block diagram (Camcorder adapter)

15-2-2. Operation

1. Adapter mode

When the DC plug is attached to the adapter, the constant DC voltage (6.8V, 2.0A) can be obtained via the DC jack to operate the camcorder.

The power consumption can be kept constant over the entire control input range, i.e. regardless of input fluctuations.

The output is available up to 1.5 times the rated current, such as a transient starting current and rush current which would flow in the camcorder.

Also, the adapter output overcurrent protector with fold back current, which controls the power when the short circuit from the outside occurs, is used to prevent the adapter from being destroyed or broken down. It also prevents the temperature inside the adapter from rising too excessively.

2. Ni-Cd charge mode

This adapter, when Ni-Cd battery is attached, can be used as a quick charger. This charging operation is divided into operating modes of three stages. The adapter goes through these modes sequentially.

Fig.15-2-2 shows the charging characteristics in these three stages.

The first stage is called initial charging. A constant current of 1.2A is charged with a limited voltage of 9.5V for 5 minutes, set by the timer, from point A.

The voltage is thus limited in order to protect the battery against overvoltage and overcharging which would otherwise occur on a fully-charged battery.

The time limit serves to prevent charging error which would take place on a dead battery due to an initial voltage drop.

The second stage is a quick charging mode. Like in the initial charging, a rapid 1.2A charging is made with a limited voltage of 9.5V, but for the timer-controlled charging time of 180 minutes.

Toward the end of this mode, a battery voltage drop ($-\Delta V$ phenomenon at point B) is detected to tell the end of the quick charging, to stop the charging and to go to the next stage.

In this quick 1.2A charging, the 1100mAh battery and the 2400mAh battery are fully charged in about 65 minutes and about 140 minutes, respectively. The timer is set to 180 minutes by which an overcharging possibly due to $-\Delta V$ detection error can be avoided.

The $-\Delta V$ detection level is 80-120mV, in which range noise-caused detection errors are kept off.

In the third stage called trickle charging, auxiliary charging is carried on between points C and D. By so doing, the battery can be fully charged.

The trickle charging is generally set at 1/20-1/30C depending on a battery's characteristics. This adapter adopts a charging system that is controlled by a constant voltage and fixed resistance.

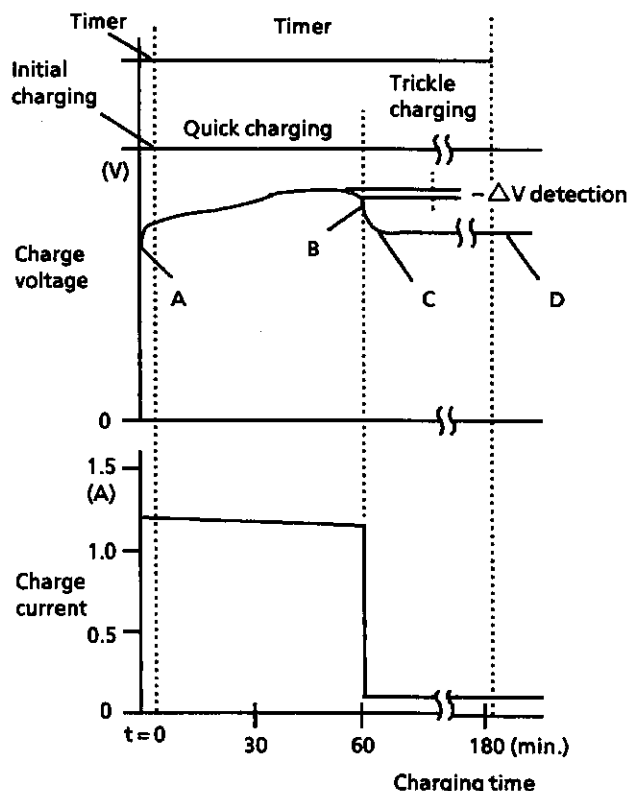


Figure 15-2-2. Charging characteristics with 1100mAh battery

3. Refresh mode

This adapter is prone to a drop in charging efficiency due to their peculiar memory effect. To avoid the drop, this battery may be forcedly discharged using the user switch. Now the battery is ready to get charged anew in the above-mentioned steps.

Push the refresh switch with the battery in place, and a discharge current of 0.3-0.7A flows out and the power is consumed by the resistor inside the adapter.

To minimize its degrading, the battery is discharged down to 5.0V or so, not further down. Then the battery goes into the charging mode.

15-2-3. Circuits

The circuits used for the adapter are explained according to the circuit diagram in page 16-7.

1. Input section

The input section consists of noise filter and rectification smoothing circuit of condenser input. The noise filter, which consists of L1, C1, C26, C27 and C28, reduces common mode noise.

R61 is a resistance for discharging electricity retained at input AC plug when the power is turned off.

The amount of rush current which is caused when the power is turned on is greatly limited by R2, DC resistance of L1 and the operating resistance of D1.

2. Switching section

The switching circuit, corresponding to the signals sent from the IC for controlling the primary side, makes FET Q1 work as a drive as a switch by using the DC voltage rectified through C2. It, together with the transformer T1, makes up a high-frequency inverter.

R3 and C3 are surge absorber circuits which absorb the surge voltage generated from the switching of Q1.

3. Primary side control section

This section drives the switching section by converting the pulse duration of the signal received from the secondary side control circuit through the photo coupler.

The control IC (IC4) is used to drive Q1 (MOS FET). This IC, operating as an overvoltage protector, contains a circuit which stops oscillating when it detects the overvoltage at D20.

4. Output circuit section

The secondary side output, which can be controlled by a popular on-off system, reduces output ripples and common mode noise through the choking coils of L2 and L4.

Q7 is a transistor for the quick / trickle charging selector switch. When Q7 is on, constant-current quick charging is made, and when off, the trickle current flows through R40 and R41.

D10 is used to prevent discharging trouble to the control circuit section caused when the input is turned off with the battery attached.

5. Battery detection circuit

The transistor switch in Q7 is kept off without the battery in position. Once the battery has been placed, the impedance of the battery makes current flow out of D11, which turns on Q13 and Q14 to let pin 10 of IC3 detect that the battery is in position and also turns on the transistor switch to let the charging operation start.

6. Secondary side control section

The function of the secondary control section is to control the switching section by detecting the output voltage and current and conducting the detected signals to the primary side control circuit through the photo coupler.

The constant voltage is preset and detected with IC2-II, whereas the adapter (6.8 V)/charge (10.5 V) mode selection is made by setting pin 5 of IC3 to "H" or "L" to change the reference voltage. The constant current and over-current protector are preset and detected with IC2-I, while 1.2 A/0.4 A constant current selection is made with the seventh output of IC3. The over-current protection in the adapter mode is performed by the primary control circuitry.

IC1 is used to give the drive power for IC3 and a reference voltage for IC2. Fed into IC2 are the signal of a divided reference voltage as well as that of a divided output voltage and current for comparison.

7. Display

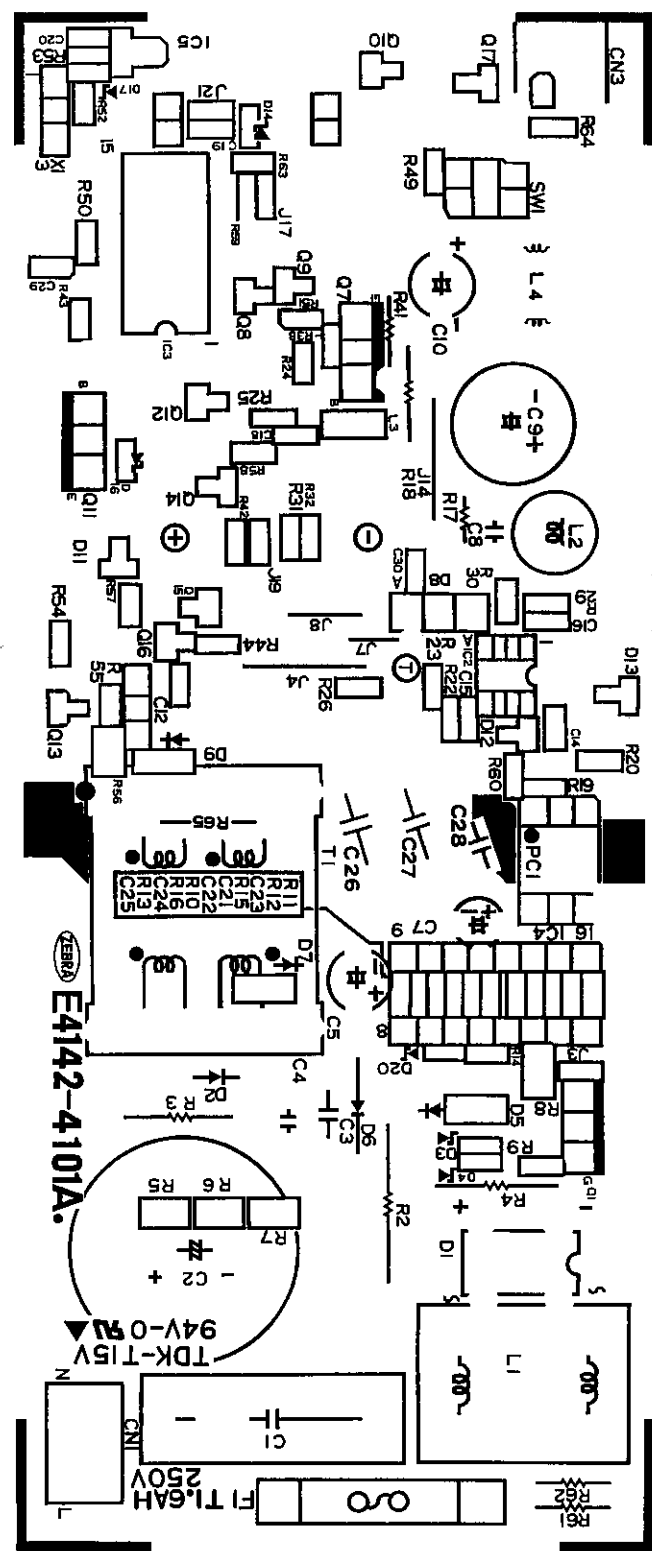
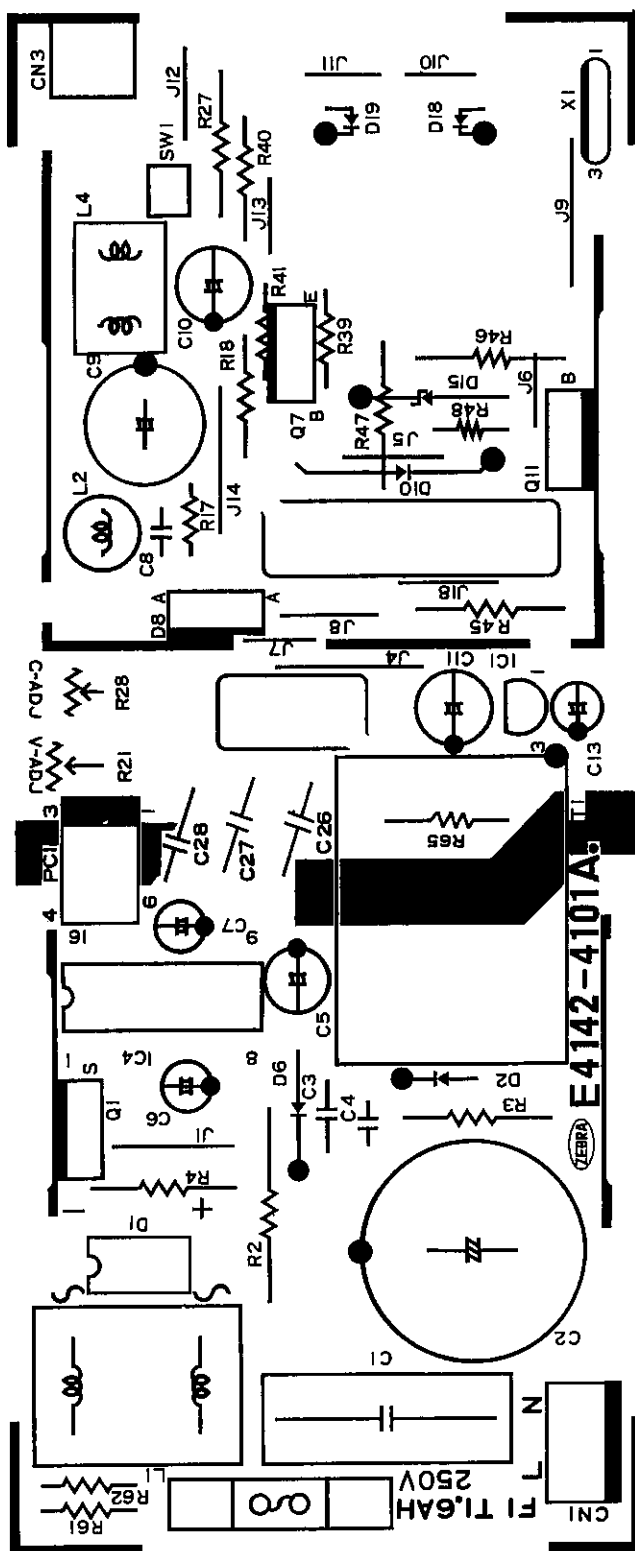
Only LED (D18) lights up in ADP mode.

In CHG mode, D18 and D19 light up during rapid charging. When rapid charging is completed (trickle mode), only D19 goes out.

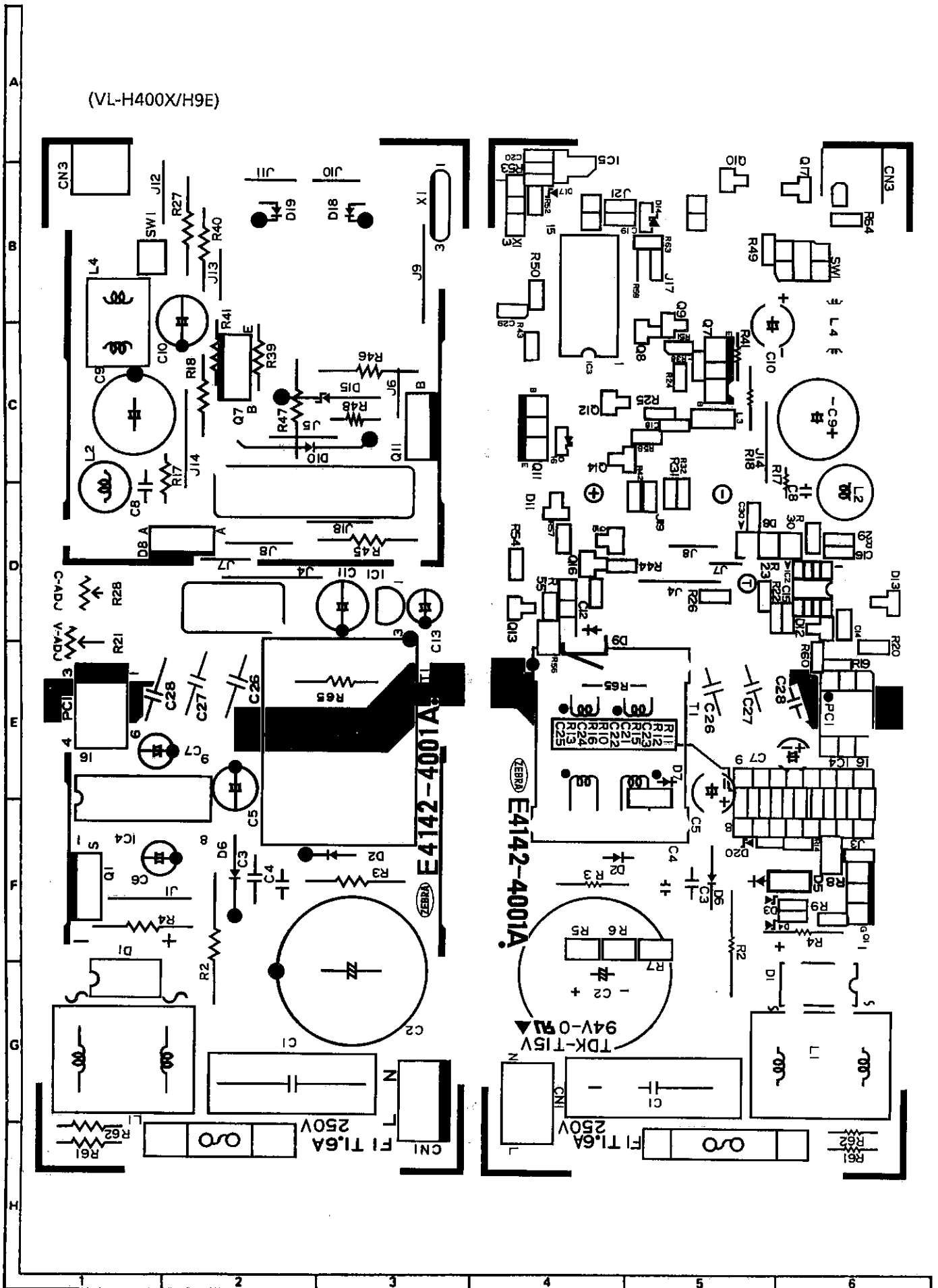
In refresh mode, D18 stays lit with D19 flashing. The instant the discharging has been completed, the rapid charging starts and D19 stops flashing to stay lit.

15-3. AC ADAPTER P.W.B.

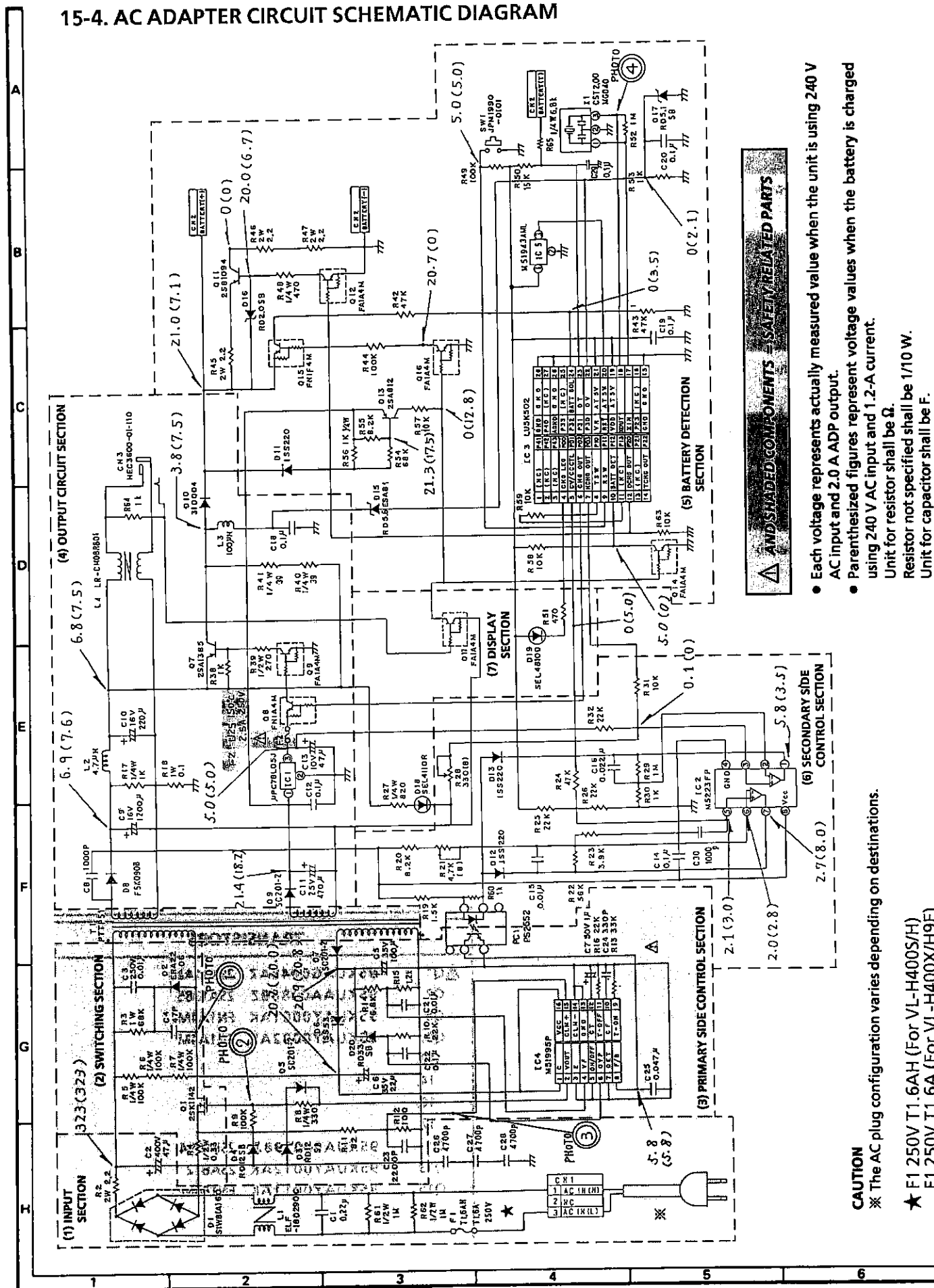
(VL-H400S/H)



(VL-H400X/H9E)



15-4. AC ADAPTER CIRCUIT SCHEMATIC DIAGRAM



- Each voltage represents actually measured value when the unit is using 240 V AC input and 2.0 A ADP output.
- Parentthesized figures represent voltage values when the battery is charged using 240 V AC input and 1.2-A current.
- Unit for resistor shall be Ω .
- Resistor not specified shall be 1/10 W.
- Unit for capacitor shall be F.

CAUTION
* The AC plug configuration varies depending on destinations.

* F1 250V T1.6AH (For VL-H400S/H)
* F1 250V T1.6A (For VL-H400X/H9E)

● ADP mode

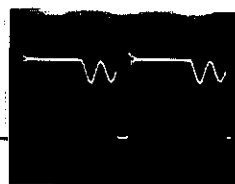
● CHG mode

①



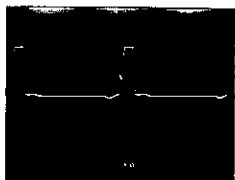
100V, 2μsec/div

GND



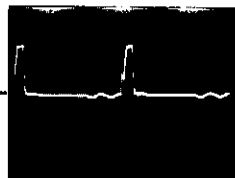
100V, 2μsec/div

②



5V, 2μsec/div

GND



5V, 2μsec/div

③



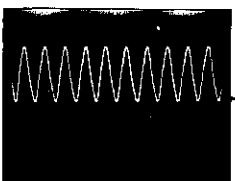
50mV, 2μsec/div

GND



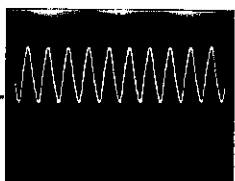
50mV, 2μsec/div

④



2V, 0.5μsec/div

GND



2V, 0.5μsec/div

15-5. REPLACEMENT PARTS LIST/ EXPLODED VIEWS

PARTS REPLACEMENT

Many electrical and mechanical parts in camcorder have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual; electrical components having such features are identified by Δ and shaded areas in the Replacement Parts Lists and Schematic Diagrams. The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

- | | |
|-----------------|----------------|
| 1. MODEL NUMBER | 2. REF. NO. |
| 3. PART NO. | 4. DESCRIPTION |
| 5. PRICE CODE | |

Δ MARK: SAFETY RELATED PARTS

PWB ASSEMBLY IS NOT REPLACEMENT ITEM

| Ref. No. | Part No. | Description | Code |
|----------|----------|-------------|------|
|----------|----------|-------------|------|

INTEGRATED CIRCUITS

| | | | |
|--------------|--------------|-----------|----|
| IC1 | 95KUCB0068AK | UPC78L05J | AF |
| IC2 | 95KUCY0011AK | M5223FP | AE |
| IC3 | 95KUCY0012AK | LU5K502 | AQ |
| Δ IC4 | 95KUCC0044AZ | M51995P | AP |
| IC5 | 95KUCY0013AK | M51943AML | AF |

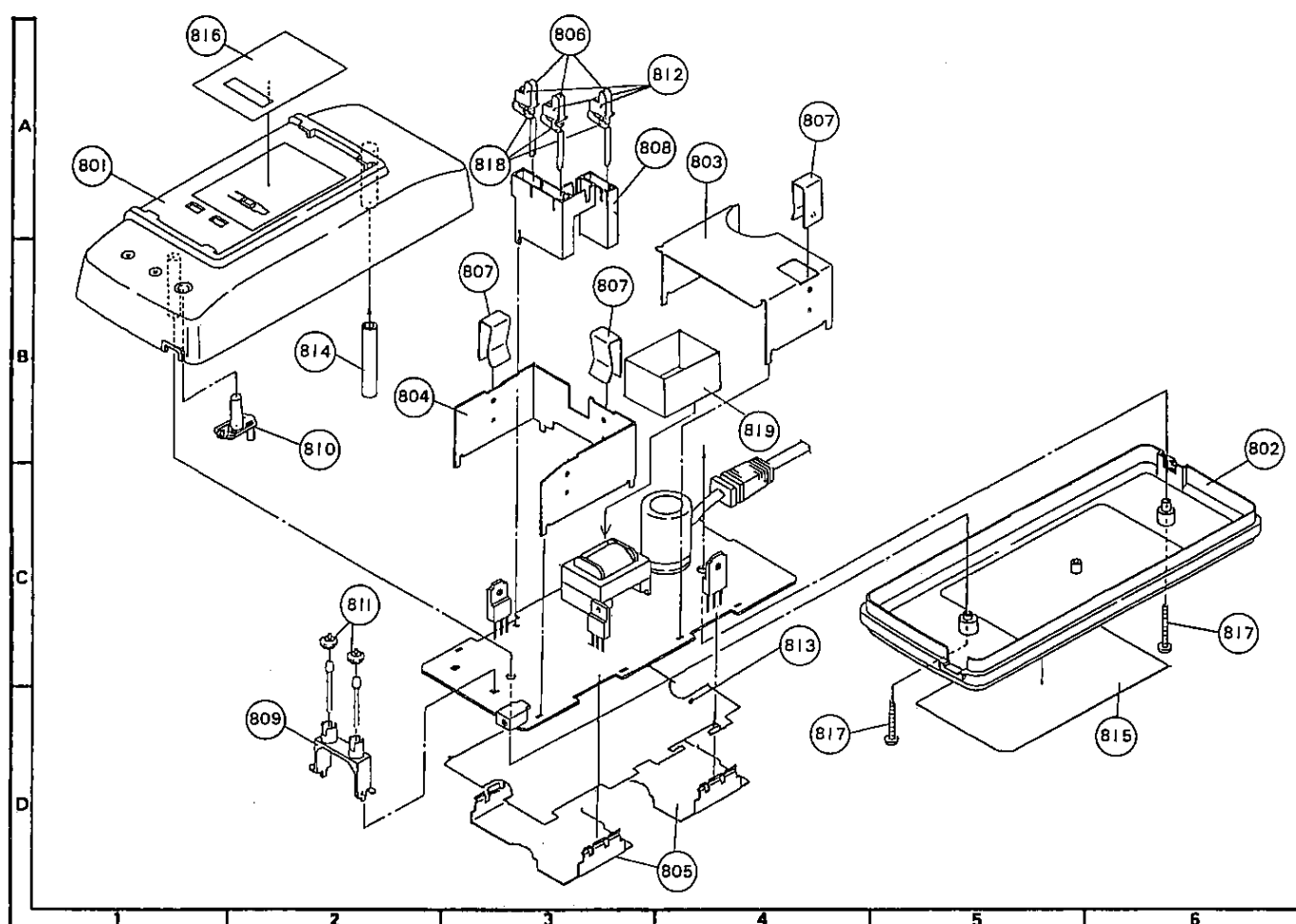
TRANSISTORS

| | | | |
|-------------|--------------|---------|----|
| Δ Q1 | 95KUAG0048AZ | 2SK1142 | AM |
| Q7 | 95KUAA0086BZ | 2SA1385 | AG |
| Q8 | 95KUAY0001AK | FN1A4M | AC |
| Q9, | 95KUAY0002AK | FA1A4M | AC |
| 12, | | | |
| 14, | | | |
| 16, | | | |
| 17 | | | |
| Q11 | 95KUAB0019BZ | 2SB1094 | AG |
| Q13 | 95KUAY0012AK | 2SA812 | AB |
| Q15 | 95KUAY0011AK | FN1F4M | AC |

| Ref. No. | Part No. | Description | Code | Ref. No. | Part No. | Description | Code |
|------------------------------|--------------|-----------------------------------|------|------------------|--------------|--------------------------------------|------|
| DIODES | | | | | | | |
| △D1 | 95KUBB0148DZ | S1WB(A)60 | AF | △C7 | 95KUGAF010FD | 1μF, 50V, ±20%,
Electrolytic | AB |
| △D2 | 95KUBC0169CL | ERA22-06 | AC | | or | | |
| △D3, | 95KUBXAD120C | RD12SB | AC | | 95KUGAF010HN | | AB |
| △ 4 | | | | C8 | 95KUGCZ102BQ | 1000pF, 500V, +100%~
-0%, Ceramic | AB |
| △D5, | 95KUBY0015AK | SC201-2 | AD | C9 | 95KUGAC122N5 | 1200μF, 16V, ±20%,
Electrolytic | AE |
| △ 7, | | | | C10 | 95KUGAC221FD | 220μF, 16V, ±20%,
Electrolytic | AC |
| 9 | | | | | or | | |
| △D6 | 95KUBA0004KZ | 1S553-T4 | AB | | 95KUGAC221HN | | AC |
| D8 | 95KUBC0167ET | F5KQ90B | AH | C11 | 95KUGZ0832ZZ | 470μF, 25V, ±20%,
Electrolytic | AD |
| | or | | | C12, | 95KUGXAFF104 | 0.1μF, 50V, +80%~
-20%, Ceramic | AB |
| | 95KUBB0168FZ | F10P10Q | AK | 14, | | | |
| D10 | 95KUBC0095BB | 31DQ04FC | AE | 18, | | | |
| D11 | 95KUBY0007AK | 1S5220 | AC | 19, | | | |
| 12 | | | | 20, | | | |
| 13 | | | | △ 22, | | | |
| D15 | 95KUBDAK5R6B | RD5.6ESAB1 | AB | 29 | | | |
| D16 | 95KUBXAD2R0A | RD2.0SB-T1 | AC | C13 | 95KUGAB470FD | 47μF, 10V, ±20%,
Electrolytic | AB |
| D17 | 95KUBXAD5R1B | RD5.1SB1 | AC | | or | | |
| D18 | 95KUDC0137ZZ | SEL4110R | AC | | 95KUGAB470HN | | AB |
| D19 | 95KUDC0138ZZ | SEL4810D | AC | C15, | 95KUGXAEF103 | 0.01μF, 50V, ±10%,
Ceramic | AB |
| △D20 | 95KUBXAD330A | RD33SB | AC | △ 21 | 95KUGXAEF223 | 0.022μF, 50V, ±10%,
Ceramic | AB |
| | | | | C16 | 95KUGXAEF222 | 2200pF, 50V, ±10%,
Ceramic | AA |
| COILS AND TRANSFORMER | | | | △C23 | 95KUGXAEF222 | 2200pF, 50V, ±10%,
Ceramic | AA |
| △L1 | 95KUKZ0306ZZ | Choke | AK | △C24 | 95KUGXAEF331 | 330pF, 50V, ±10%,
Ceramic | AA |
| L2 | 95KUKZ0496ZK | 4.7μH, Filter | AE | △C25 | 95KUGXAFF473 | 0.047μF, 50V, +80%~
-20%, Ceramic | AB |
| L3 | 95KUKY0001AK | 100μH | AE | △C26 | 95KUGCZ472CH | 4700pF, 250V, ±20%,
Ceramic | AD |
| L4 | 95KUKZ0497ZZ | Choke | AH | △C27 | 95KUGCQ472AB | 4700pF, 400V, ±20%,
Ceramic | AD |
| △T1 | 95K129035044 | PTTP51, Power Transformer | AV | △C28 | 95KUGCZ472CH | 4700pF, 400V, ±20%,
Ceramic | AD |
| X1 | 95KUZZ0128ZZ | Crystal | AF | C30 | 95KUGXAEF102 | 1000pF, 50V, ±10%,
Ceramic | AA |
| CONTROLS | | | | | | | |
| R21 | 95KUFBA472CY | 4.7k(B) | AC | RESISTORS | | | |
| R28 | 95KUFBA331CY | 330(B) | AC | △R2 | 95KUEAE2R2AF | 2.2 ohm, 2W, ±5%, Metal | AE |
| CAPACITORS | | | | △R3 | 95KUEFD683BH | 68k ohm, 1W, ±5%,
Metal Film | AB |
| △C1 | 95KUGFZ224FE | 0.22μF, 250V, ±20%, Film | AF | △R4 | 95KUEFCR33AW | 0.33 ohm, 1/2W, ±10%,
Metal Film | AA |
| △C2 | 95KUGZ0831ZZ | 47μF, 400V, ±20%,
Electrolytic | AK | △R5, | 95KUEXJAA104 | 100k ohm, 1/4W, ±5%,
Carbon | AA |
| △C3 | 95KUGFM103FB | 0.01μF, 250V, ±10%,
Film | AC | △ 6, | | | |
| | or | | | △ 7 | | | |
| | 95KUGFQ103FB | | AC | △R8 | 95KUEXJAA331 | 330 ohm, 1/4W, ±5%,
Carbon | AA |
| △C4 | 95KUGCU470BG | 47pF, 1kV, ±10%, Ceramic | AB | | | | |
| △C5 | 95KUGAE101JG | 100μF, 35V, ±20%, Film | AC | | | | |
| | or | | | | | | |
| | 95KUGAE101HN | | AC | | | | |
| △C6 | 95KUGAE220FD | 22μF, 35V, ±20%,
Electrolytic | AB | | | | |
| | or | | | | | | |
| | 95KUGAE220HN | | AB | | | | |

| Ref. No. | Part No. | Description | Code | Ref. No. | Part No. | Description | Code |
|-----------------------------------|------------------------------------|----------------------------------|------|-------------------|------------------------------------|-------------------------------------|------|
| △R9,
44,
49 | 95KUEXCAC104
or
95KUEXCAA104 | 100k ohm, 1/10W, ±5%,
Carbon | AA | R39 | 95KUEEC271BE
or
95KUEEC271AT | 270 ohm, 1/2W, ±5%,
Carbon | AA |
| △R10,
△16,
25,
26,
32 | 95KUEXCAC223
or
95KUEXCAA223 | 22k ohm, 1/10W, ±5%,
Carbon | AA | R40,
41 | 95KUEEB390BE
or
95KUEEB390BF | 39 ohm, 1/4W, ±5%,
Carbon | AA |
| △R11 | 95KUEXCAC820 | 82 ohm, 1/10W, ±5%,
Carbon | AA | R45,
46,
47 | 95KUEFE2R2BJ | 2.2 ohm, 2W, ±5%,
Metal Film | AC |
| △R12 | 95KUEXCAC101
or
95KUEXCAA101 | 100 ohm, 1/10W, ±5%,
Carbon | AA | R48 | 95KUEEB471BE
or
95KUEEB471BF | 470 ohm, 1/4W, ±5%,
Carbon | AA |
| △R13 | 95KUEXCAC333
or
95KUEXCAA333 | 33k ohm, 1/10W, ±5%,
Carbon | AA | R50 | 95KUEXCAC153
or
95KUEXCAA153 | 15k ohm, 1/10W, ±5%,
Carbon | AA |
| △R14 | 95KUEXCAC682
or
95KUEXCAA682 | 6.8k ohm, 1/10W, ±5%,
Carbon | AA | R51 | 95KUEXCAC471
or
95KUEXCAA471 | 470 ohm, 1/10W, ±5%,
Carbon | AA |
| △R15 | 95KUEXCAC122 | 1.2k ohm, 1/10W, ±5%,
Carbon | AA | R54 | 95KUEXCAC683
or
95KUEXCAA683 | 68k ohm, 1/10W, ±5%,
Carbon | AA |
| R17 | 95KUEEB102BE
or
95KUEEB102BF | 1k ohm, 1/4W, ±5%,
Carbon | AA | R55 | 95KUEXCAC822
or
95KUEXCAA822 | 8.2k ohm, 1/10W, ±5%,
Carbon | AA |
| R18 | 95KUEFDR10BE | 0.1 ohm, 1W, ±10%,
Metal Film | AD | R56 | 95KUEXJAA102 | 1k ohm, 1/4W, ±5%,
Carbon | AB |
| R19 | 95KUEXCAC152
or
95KUEXCAA152 | 1.5k ohm, 1/10W, ±5%,
Carbon | AA | △R61,
△62 | 95KUEEC105BE
or
95KUEEC105AT | 1M ohm, 1/2W, ±5%,
Carbon | AA |
| R20 | 95KUEXCAC822
or
95KUEXCAA822 | 8.2k ohm, 1/10W, ±5%,
Carbon | AA | R65 | 95KUEEB682BE
or
95KUEEB682BF | 6.8k ohm, 1/4W, ±5%,
Carbon | AA |
| R22 | 95KUEXCAC563
or
95KUEXCAA563 | 56k ohm, 1/10W, ±5%,
Carbon | AA | MISCELLANEOUS | | | |
| R23 | 95KUEXCAC392 | 3.9k ohm, 1/10W, ±5%,
Carbon | AA | △F1★ | 95KPJCTG1601 | Fuse, T1.6AH, 250V
(VL-H400S/H) | AG |
| R24,
42,
43 | 95KUEXCAC473 | 47k ohm, 1/10W, ±5%,
Carbon | AA | △F1★ | 95KPJCTB1601 | Fuse, T1.6A, 250V
(VL-H400X/H9E) | AE |
| R27 | 95KUEEB821BE
or
95KUEEB821BF | 820 ohm, 1/4W, ±5%,
Carbon | AA | △F2 | 95KPJT0085ZZ | Fuse, U25, 150°C,
2.5A, 250V | AE |
| R29,
52 | 95KUEXCAC105
or
95KUEXCAA105 | 1M ohm, 1/10W, ±5%,
Carbon | AA | △PC1 | 95KUDC0093BZ | Photo Coupler, PS2652-K | AF |
| R30,
38,
53,
60,
64 | 95KUEXCAC102
or
95KUEXCAA102 | 1k ohm, 1/10W, ±5%,
Carbon | AA | △※ | 95KEHS0528ZZ | AC Cord (VL-H400S) | AN |
| R31,
57,
58,
59,
63 | 95KUEXCAC103
or
95KUEXCAA103 | 10k ohm, 1/10W, ±5%,
Carbon | AA | △※ | 95KEHS0631ZZ | AC Cord (VL-H400H) | |
| | | | | △※ | 95KEHS0634ZZ | AC Cord (VL-H400X) | |
| | | | | △※ | 95KEHS0531ZZ | AC Cord (VL-H9E) | |
| | | | | CN1 | 95KPKZ0194ZZ | Connector, Post | AC |
| | | | | CN3 | 95KPGZ0024ZZ | Connector, Jack | AE |
| | | | | SW1 | 95KPFZ0219ZZ | Switch, Refresh | AC |

| Ref. No. | Part No. | Description | Code | Ref. No. | Part No. | Description | Code |
|---|--------------|---------------------------------------|------|----------------------|--------------|---------------------------------------|------|
| ※ Remark:
When changing main cord the whole cord with connection plug must be changed. (VL-H400S only)
The cable is kept as a spare part by: <ul style="list-style-type: none"> • SWEEDEN
SHARP ELECTRONICS (SVENSKA) AB • DENMARK
RUDOLPH SCHMIDT A/S • FINLAND
ASA KULUTUS ELEKTRONIIKA OY • NORWAY
TRANSEL A/S | | | | CABINET PARTS | | | |
| 801 | 95KMRZ5234ZZ | Cabinet, Upper | AM | 801 | 95KMRZ5234ZZ | Cabinet, Upper | AM |
| 802 | 95KMRZ5228ZZ | Cabinet, Lower | AL | 802 | 95KMRZ5228ZZ | Cabinet, Lower | AL |
| 803 | 95KLRZ5893ZP | Sink, Heat | AE | 803 | 95KLRZ5893ZP | Sink, Heat | AE |
| 804 | 95KLRZ5894ZP | Sink, Heat | AE | 804 | 95KLRZ5894ZP | Sink, Heat | AE |
| 805 | 95KLRZ5892ZZ | Plate, Shield | AD | 805 | 95KLRZ5892ZZ | Plate, Shield | AD |
| 806 | 95KFBZ0108ZZ | Terminal | AC | 806 | 95KFBZ0108ZZ | Terminal | AC |
| 807 | 95KLRS5015ZZ | Supporter | AC | 807 | 95KLRS5015ZZ | Supporter | AC |
| 808 | 95KMRZ5225ZZ | Terminal Box | AE | 808 | 95KMRZ5225ZZ | Terminal Box | AE |
| 809 | 95KMRZ5221ZZ | Holder, LED | AE | 809 | 95KMRZ5221ZZ | Holder, LED | AE |
| 810 | 95KMRZ5224ZZ | Switch, Refresh | AD | 810 | 95KMRZ5224ZZ | Switch, Refresh | AD |
| 811 | 95KMRZ5222ZZ | Lens, LED | AC | 811 | 95KMRZ5222ZZ | Lens, LED | AC |
| 812 | 95KMRZ5231ZZ | Supporter | AC | 812 | 95KMRZ5231ZZ | Supporter | AC |
| 813 | 95KGZZ5108ZZ | Sheet, Insulator | AC | 813 | 95KGZZ5108ZZ | Sheet, Insulator | AC |
| 814 | 95KMRZ5232ZZ | Boss | AC | 814 | 95KMRZ5232ZZ | Boss | AC |
| 815 | 95KSBB1578ZZ | Label Model (VL-H400S) | AD | 815 | 95KSBB1578ZZ | Label Model (VL-H400S) | AD |
| 815 | 95KSBB1579ZZ | Label Model (VL-H400H) | | 815 | 95KSBB1579ZZ | Label Model (VL-H400H) | |
| 815 | 95KSBB1603ZZ | Label Model (VL-H400X) | | 815 | 95KSBB1603ZZ | Label Model (VL-H400X) | |
| 815 | 95KSBB1580ZZ | Label Model (VL-H9E) | | 815 | 95KSBB1580ZZ | Label Model (VL-H9E) | |
| 816 | 95KSBB1577ZZ | Label | AD | 816 | 95KSBB1577ZZ | Label | AD |
| 817 | 95KRAZF002ZE | P Tight Screw,
Pan Head (2.6 x 20) | AA | 817 | 95KRAZF002ZE | P Tight Screw,
Pan Head (2.6 x 20) | AA |
| 818 | 95KLRZ5912ZZ | Spring | | 818 | 95KLRZ5912ZZ | Spring | |
| 819 | 95KGZZ5112ZZ | Plate, Insulator | | 819 | 95KGZZ5112ZZ | Plate, Insulator | |



VL-H400S/H/X
VL-H9E

SHARP

T9169-S
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